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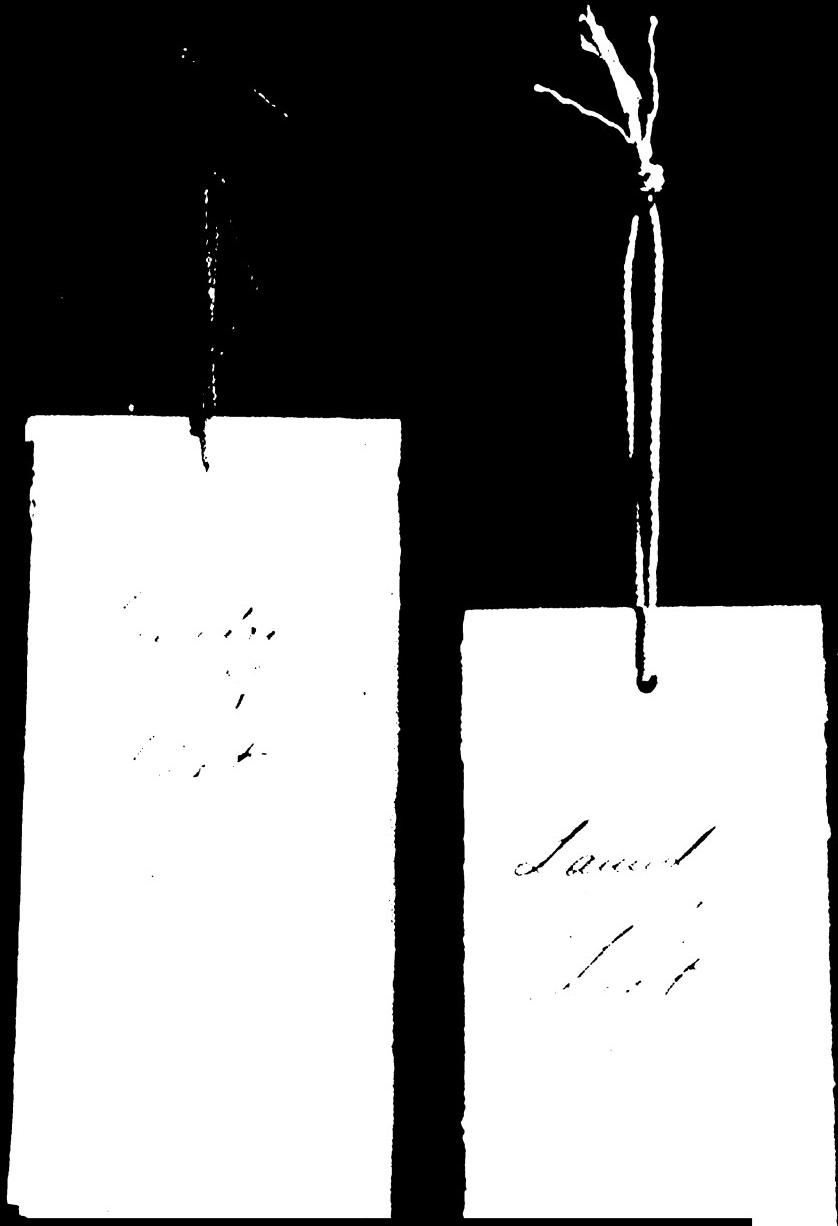
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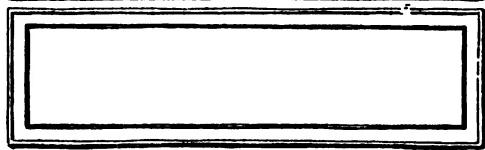
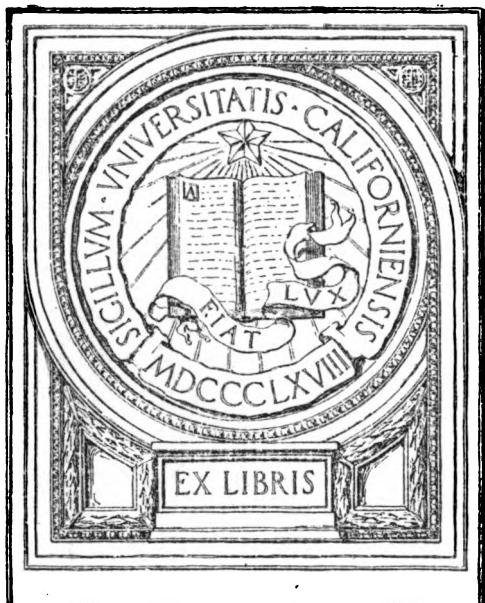
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Paper and cardboard construction

George Frederick Buxton, Fred Llewellyn Curran



PAPER AND CARDBOARD CONSTRUCTION

AN ANALYSIS OF THE SCOPE OF PAPER AND CARDBOARD CONSTRUCTION FOR
PRIMARY GRADES OF PUBLIC SCHOOLS. AN OUTLINE OF A COURSE WITH
DIRECTIONS FOR MAKING THE PROBLEMS. INFORMATION REGARD-
ING COURSES, EQUIPMENT, SUPPLIES, AND METHODS OF HAND-
LING THE WORK. A BIBLIOGRAPHY OF THE SUBJECT.

BOOK PROBLEMS BOX PROBLEMS CARD PROBLEMS ENVELOPE PROBLEMS

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FOURTH EDITION, 1916

TO MARY
AMERICAN

FOREWORD

REALIZING that teachers of primary handwork need definite directions for handling paper and cardboard construction in public school classes, with such supplementary information regarding the selecting, ordering, and care of equipment and supplies as shall be of immediate help in starting the work, the authors have prepared the following outlines and notes in the form of a hand book especially for their use.

It is also planned to be of service to supervisors of primary handwork as a suggestion for the organization of a course of study and as a collection of supplementary problems suitable for the lower grades. The notes at the back of the book may be of considerable value in saving time looking up minor details. Art supervisors who handle paper and cardboard construction may find the book problems suggestive as a basis for decorative and illustrative treatment.

Problems have been selected which are suited to the grades indicated and have been carefully tested by grade teachers in the Menomonie public schools for several years. The point of view thruout the course has been that of an emphasis upon the simple processes involved in typical uses of paper and cardboard in the industries, making such modifications as are required to meet the abilities of young children, and to eliminate all apparatus used in duplicate work in such industries. The attempt is made to involve a rational sequence of difficulty in each kind of work undertaken and to encourage careful work from the start. Altho the production of good pieces of work is made prominent in the course, teachers may choose to use certain of the problems for illustrative purposes in connection with other subjects. In any case, the primary handwork should be so handled that the entire school program will become unified for the benefit of the pupil and not stereotyped for the benefit of a logical course.

PREFACE TO REVISED EDITION

THE authors of Paper and Cardboard Construction have been pleased with the comments and extended use the book has been given in its first edition, and have carefully gone over the text and made an effort to have the second edition still more usable and attractive. Many half-tone illustrations have been provided for the present volume with the thought that the directions may be more easily interpreted and the pages be made more attractive.

The publication has been turned over to The Manual Arts Press and at their suggestion the book has been largely remade. The pages have been increased in size, the style of type changed, a different paper used, and larger line cuts made, all of which, the authors believe, will make the book more valuable to the class of teachers and school officers who will use it.

Errors in the previous edition have been corrected and every effort made to have all details and explanations adequate in the revision. Drawings have been remade and the text changed wherever these changes would make the meaning clearer.

While planned especially for teachers of handwork in primary grades, the book has found a use with several classes of pupils in the upper grades. It has been given an unlooked-for reception in normal schools, and has been used by many special lecturers and teachers doing teachers' institute work. Its general circulation in libraries has been gratifying along with its adoption by boards of education as a standard text or reference book. A considerable proportion of the demand for the first edition has been from supervisors of drawing and manual training who are usually responsible for the primary handwork.

February, 1913.

ANALYSIS OF CONTENTS

I. Introduction page 11

The purpose of the book is to arrange typical paper constructions in sequence for class use,—there is an evident need for this handy form,—simple paper cutting should accompany the construction here outlined,—illustrative constructions not appropriate to paper are omitted,—unusual shapes are not recommended,—four kinds of work in paper are given for each of the first four grades and classified by numbers,—extra work is suggested for schools having time for it,—a standard size of stock is to be used,—it is shown that the teacher must make careful preparation before presenting a new problem.

II. Book problems page 15

Sequences are suggested but detailed directions may be omitted,—books may be made as an aid to other studies,—art teachers find many uses for small books,—problems here are limited to 9"x 12" stock,—an arrangement by grades is suggested,—a definite arrangement of information is made for each problem.

The following groups are given to show the scope covered:

Folders:—Two, three, and four fold; booklet folder.

Portfolios:—Single paper, paper with lap, cloth covered, with cloth corners, note-book covers.

Paper Files:—Pocket and desk files.

Pamphlets:—For notes, drawings, and mountings; glued, tied, sewed, and with reinforced back.

Bound Books:—Cloth covered, with cloth corners, bound magazines, rebinding.

III. Box problems page 65

Box making as an industry is important, many uses of boxes in schools suggest themselves,—devices for repeating processes are omitted here,—box problems are arranged by grades.

The following groups are given to show the scope covered:

Open Boxes:—Tag board, bristol board; covers lapped, reinforced corners, trays.

Folding Boxes:—Tag board, bristol board; with laps, with fitted fastenings.

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Covered Boxes:—Strawboard, box board; reinforced corners, lining, covering.

Sliding Box:—Box board, fitting of box and case.

IV. Card problems page 91

Card mounts furnish a good opportunity for a study of color and design,—various illustrative materials may be mounted for use,—card problems give good drill in measuring and cutting to line,—a sequence of difficulty is shown for all card problems.

The following groups are given to show the scope covered:

Card Mounts:—For drawings, and photos; folder picture mounts.

Book Marks:—Simple outline, punched and cut with tab.

Tag Board Work:—Glass cover, post cards, shipping tag.

V. Envelope problems page 110

Envelopes are thoroly suited to paper work,—a variety of envelope problems may be introduced with profit into the lower grades,—many uses are obvious,—an arrangement is shown for each grade.

The following groups are given to show the scope covered:

Mailing Envelopes:—Square, medium, long.

Filing Envelopes:—Paper envelope holder, pocket for clip-pings, tag board filing envelopes.

Envelope Files:—Flat envelope file, book envelope file.

Paper Bags:—Flat and with folds.

VI. Planning of courses page 131

The book is planned to be suggestive for a variety of systems and requirements,—fundamentals in planning include the adjustment of problems to fulfill stated aims and the suggestion of method,—the numbering system is explained.

Courses in primary handwork may be planned with an emphasis upon sequence of processes, upon grouping of types of construction, or upon the thought side of the subject,—the work may be considered from the standpoint of the technical and art value of the subject itself or from that of the whole elementary school course,—the analysis of the course may center around the handling of the work in classes or it may concern itself first with a study of children's interests.

Different arrangements by grades are suggested and others may seem desirable in certain localities,—the first arrangement provides for all of the book problems in a given grade to be

ANALYSIS OF CONTENTS

followed by all of the box problems, then the card problems and envelope problems,—the second provides for a succession of one of each kind of problem, followed by a succession of another of each kind, and then another, for the sake of the interest which comes from variety,—the third provides for a selection from each of the groups arranged in order of difficulty for the entire scheme,—the fourth provides for a study of one group more carefully in either the third or fourth grade.

VII. Equipment and supplies page 149

Simple equipment is needed in the class room but it should be properly cared for,—a good stock room equipment for the supervisor makes for efficiency,—several kinds of paper and cardboard are desirable,—a table for ordering paper, gives materials, kinds, sizes, costs, and quantities,—other supplies are easily obtained,—kinds of supply houses are indicated for reference,—a second table arranged by grades gives the kind and amount of stock required for each problem.

VIII. Hints to teachers and supervisors page 165

Careful preparation requires that a teacher shall analyze a problem thoroly before teaching it,—the proper care of equipment and supplies requires that things shall be instantly available, properly counted, and in usable condition,—good teaching requires that materials shall be distributed quickly and without confusion, that directions and other information shall be given in a clear, pointed, and interesting way,—good management requires that pupils shall be kept constantly busy at understood problems, that work shall be collected and cared for systematically, and that all details shall be made to fit into a complete scheme in the mind of the teacher.

A supervisor must find suitable occasion for getting necessary directions before teachers,—he must see that supplies are ordered, prepared, and delivered to schools on time,—he must visit classes and in other ways test the character of the work of teachers,—he must find some way to train such teachers as are not handling the subject successfully,—he may arrange for exhibitions of school work,—he will constantly study the various aspects of his specialty and make it of more value to his community.

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IX. Bibliography page 170

A list of books and magazine references is given for the benefit of students and public school officers and teachers.

X. Index page 175

A complete index is given to make it possible to refer instantly to each particular problem, and each topic discussed.

UNIV. OF
CALIFORNIA

I

INTRODUCTION

BOOKS on paper and cardboard work for public schools have appeared from time to time and are in many cases serving a good purpose. There still remains, however, one field which does not seem to be adequately handled and to which this book attempts to make contribution. That is:—a course in cutting, measuring, folding, pasting, gluing, sewing, punching, tying, and decorating a variety of paper materials, with a definitely organized series of problems in the making of books, boxes, card mounts, and envelopes. The problems selected are only of these four kinds, because these seem to be the most thoroly suited to the materials from the worker's stand-point and because they furnish so rich an opportunity for varied manipulations, and such an attractive basis for applied design in the lower grades.

It is believed that in presenting this arrangement of material in handy form, many teachers and supervisors will find some of the help they have been looking for, and it has already become evident that those who have attended The Stout Institute desire such a grouping as is here given. In fact, the principal reason for the preparation of this printed course is the constant demand for the less adequate blue-prints which have been issued at The Stout Institute.

Problems in simple paper cutting have been omitted from the outlines for the reason that no construction is involved and no measurements required. It is not to be inferred, however, that this work is not recommended, but it is not made a subject by itself. Paper cutting from pose and from memory, and the cutting of designs are recommended as supplementary work and provision may be made for mounting them upon the card mounts or in some of the book problems. They are especially to be recommended at the beginning of the first grade.

PAPER AND CARDBOARD CONSTRUCTION

Paper furniture and houses and other problems used in an illustrative manner in connection with other subjects are not considered a part of the present subject and not a part of the primary handwork which leads to forms of manual training in the upper grades. It is believed that most schools will find the problems which are more typical of the material, to be of more value as pieces of construction.

Unusual shapes, saw toothed edges, highly colored floral decorations, inappropriate types of construction, over-complex forms and other eccentricities should be avoided everywhere, but especially with young children. These have been carefully excluded from this outline.

While the problems are listed on the following pages as book problems, box problems, card problems, and envelope problems, it is not to be understood that they should be taken in this order and all the book problems finished before taking up the box problems. Each class of problems is planned for all four grades and distinguished by three numbers representing:—The grade; the class of work; and the relative place in the grade for that class of work. (321 covered small box,—is thus in the 3d grade; it belongs to the box problem group,—“2”; and it is the 1st box problem in the third grade.) This is more fully explained in chapter VI under “Planning of Courses”, page 132.

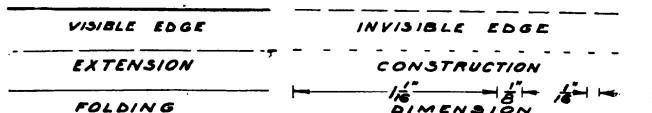
Rather more problems have been suggested than most schools can complete within the time usually allotted to the subject. This provides for considerable choice on the part of the teachers. Many options are also recommended in the foot notes.

As explained in chapter VII under “Equipment and Supplies,” the exercises are planned to use 9” x 12” stock. This is frequently to be cut into two pieces 6”x9”, and occasionally cut to other sizes. In case there is no provision for cutting a quantity of stock, the pupil may be given 9”x12” stock for everything and be required to save the unused pieces for later work. This use of uniform sizes will be found of considerable convenience in the class room.

INTRODUCTION

Before presenting the work to the classes, the teacher should: first, make the problem; second, consider carefully the various steps in the processes of construction; and third, be very definite and clear with directions. The pupil's best effort should be required at all times and his standard of good work constantly raised. A number of hints for the teacher are given in chapter VIII, but most important of all is the necessity that the teacher shall know the subject thoroly. The directions given for each problem are no substitute for careful preparation, if success is to be assured.

Six kinds of lines are given below to illustrate their use in connection with the directions for each problem suggested.



DRAFTING CONVENTIONS USED THRUOUT THE BOOK.

The above drawing is given to explain the meaning of the different lines used on the following pages. Lines representing visible outlines of the finished problem or of the successive steps involved are drawn heavy and continuous. Fold lines are made light and continuous. Edges hidden by other material are represented by long, light dashes. Construction lines are used as a help in laying out a piece of work, but they form no necessary part of the finished work; they are composed of short dashes with longer spaces. Extensions and dimensions are used in indicating sizes. Where used, these read from the bottom and right side.

For the outlines for each problem the arrangement of information is indicated below:

(I) Number and name of problem. This is fully explained in chapter VI.

PAPER AND CARDBOARD CONSTRUCTION

- (II) Material and equipment needed by each pupil. In some cases the equipment is passed from pupil to pupil, thus requiring fewer tools.
- (III) Working drawing. See drafting conventions illustrated on page 13.
- (IV) Directions for making the problem. Arranged for presentation to classes.
- (V) Notes. Supplementary suggestions and explanations.

II

BOOK PROBLEMS

PROBLEMS in the making of folders, small pamphlets, portfolios and bound books are described on the following pages and arranged in a sequence representing work of increasing difficulty for each of the first four grades of public schools. The first figure of each problem number indicates the grade in school recommended as suggested on page 12 of the introduction. The sequence is more noticeable in some places than in others, but in general it will be found that the work meets well the abilities of the children. It is within the range of successful handling and yet requires a real concentration of effort thruout the course. While sequences and definite steps are given emphasis, it will be found possible to vary considerably from the outline, and many supervisors will want to do this. It may seem best in teaching, not to give such detailed information to the children, but to assign a problem and allow the children to find out for themselves how to make it. Even here, however, the teacher must have in mind a definite line of processes in order to properly describe each problem and to be of help to each child, and the steps suggested will be found at least typical.

While the idea back of the choice of book problems has been the manipulation of material for the training of hand and eye and for an acquaintance with basic processes in the making of books by hand, there is no limit to the use which may be made of the articles made in correlation with other school subjects. Many uses of booklets for gathering notes and illustrative material will occur to the teacher. Where the making of books is incidental to the using of them, the outlines will only be used as hints. It is believed that the book problems will furnish to many teachers the directions they have been wanting in handy form for the natural correlations between construction and other school subjects.

PAPER AND CARDBOARD CONSTRUCTION

An especially valuable feature of the book problem is the opportunity it furnishes for the mounting of illustrations cut from old magazines, and of free cuttings; and much may be made of the use of books for drawings and designs, either made directly in the book or cut and mounted. Cover designs offer another attractive field for crayon and water color as well as for pencil and pen and ink work. In some cases it is possible to have the children make fairly attractive lettering upon the covers. In all cases the choice of proportions in the making of booklets is important and may be an attractive field for the art teacher. In the books suggested, the limitations due to size of stock should be obvious, as a standard size of 9"x12" for all problems has been selected. Books of larger size can be made only if extra paper cut from the full stock sheet be supplied. A list of some of the full sizes of paper is given in chapter VII, which will be found convenient for reference. If larger sheets than the 9"x12" be used, the binder's typical methods of folding may be employed and one sheet folded so as to make eight or sixteen pages of fair size. It will be noted also that if funds permit, some of the higher grades of paper may be used and better products obtained. If a printing press be available, very pleasing announcement folders and booklets for special occasions may be made and the use of type in page design be illustrated. Printing is especially desirable in upper grades and in high school classes but it does not come within the scope of this book.

The arrangement of book problems by grades is given below to enable the teacher to determine at a glance the place of a particular piece of work in the series of book problems.

FIRST GRADE

- 111 Mounting folders (Rough cover paper).
- 112 Booklet folder (Rough cover paper,—book paper).
- 113 Pocket note-books (Rough cover paper,—print paper).
- 114 Book of color schemes (Colored and gray rough cover paper).
- 115 Drawing-book (Cover paper,—book paper).
- 116 Laundry list (Manila paper).

BOOK PROBLEMS

SECOND GRADE

- 211 Paper portfolio (Cover paper or press board,—stay tape).
- 212 Paper portfolio with laps (Heavy cover paper,—stay tape).
- 213 Book of designs (Cover paper and book paper).
- 214 Weather record (Book paper).
- 215 Receipt book (Cover paper,—bond paper,—binders' cloth).
- 216 Note-book (Cover paper,—manila paper).
- 217 Paged blank book (Cover paper,—book paper).

THIRD GRADE

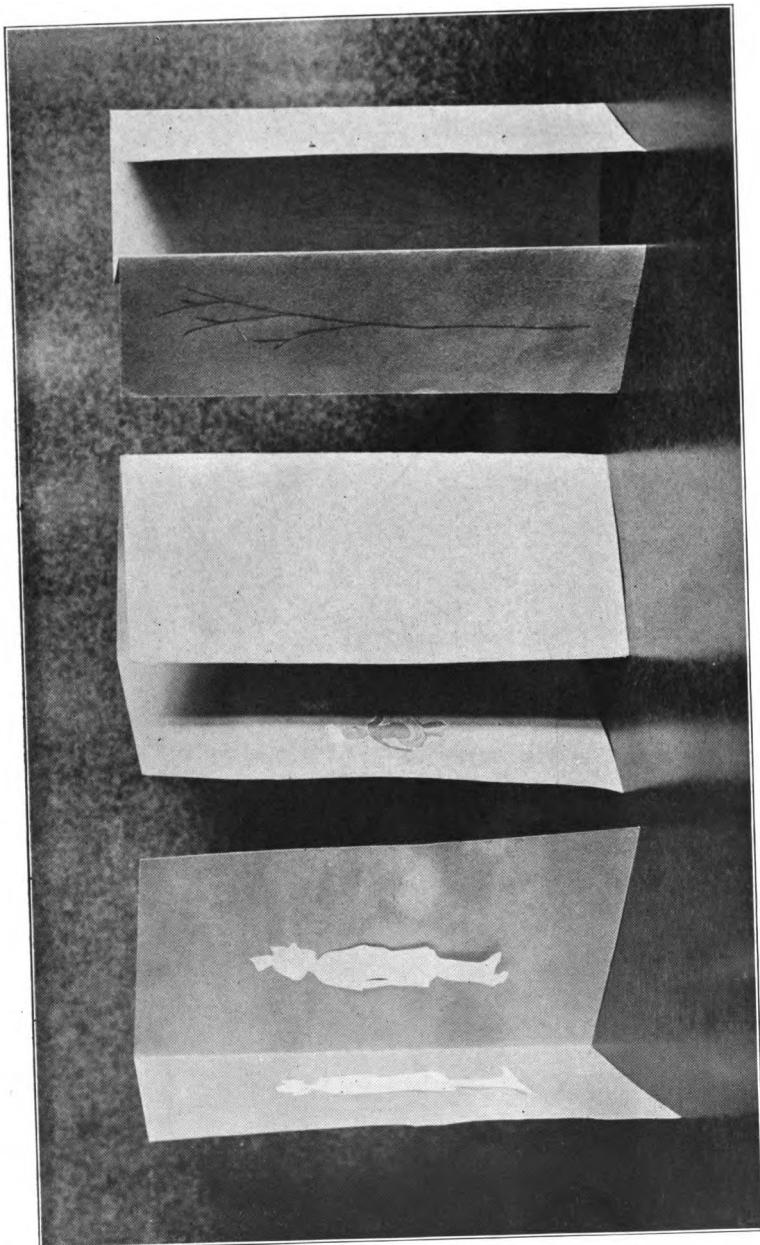
- 311 Scrap-book (Colored and gray cover paper).
- 312 Sewed pamphlet (Cover paper,—book paper).
- 313 Pamphlet with reinforced back (Cover paper,—book paper,—binders' cloth).
- 314 Cloth covered portfolio (Strawboard,—binders' cloth,—marble paper).
- 315 Glued booklet (Cover paper,—book paper).
- 316 Cloth bound book (Cloth board,—binders' cloth,—cover paper).

FOURTH GRADE

- 411 Pocket paper file (Manila tag board).
- 412 Desk paper file (Heavy tag board).
- 413 Note-book, covers (Strawboard,—binders' cloth,—cover paper, marble paper).
- 414 Portfolio with cloth corners (Cloth board,—binders' cloth,—cover paper,—marble paper).
- 415 Bound scrap-book (Strawboard,—binders' cloth,—colored and gray cover papers).
- 416 Bound drawings (Heavy cover paper).
- 417 Rebound book or bound magazines (Material depends upon problem).

It is to be understood from this list that other problems such as boxes, envelopes, and card mounts, are given in each grade following the book problems.

MOUNTING FOLDERS.



BOOK PROBLEMS

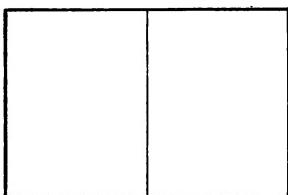
111. Mounting Folders

Rough gray cover paper, 3 pieces, 6"x 9"

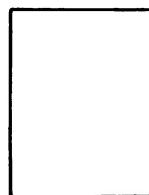
White book paper, 3 pieces, 6"x 9"

Paste

Scissors



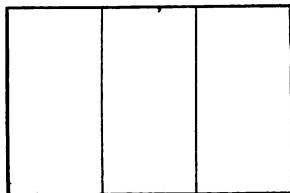
COVER STOCK—6"x 9"



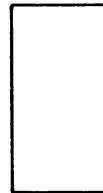
FOLDED—4½"x 6"

DIRECTIONS FOR Two-FOLD:

- a. Fold upper left corner to upper right corner and crease.
- b. Cut from white paper several representations of common objects, of flowers, leaves, trees, tools, workmen at typical occupations, or children at play. These may be cut from memory or direct observation.
- c. Select the best group of cuttings and paste in folder.



COVER STOCK—6"x 9"

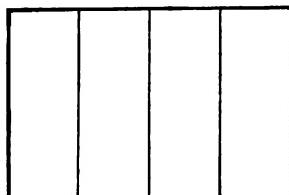


FOLDED—3"x 6"

DIRECTIONS FOR THREE-FOLD:

- a. Fold upper right corner two-thirds distance across top, judging distance with the eye.
- b. Fold upper left corner to crease.
- c. Cut and paste representations as in first folder.

PAPER AND CARDBOARD CONSTRUCTION



COVER STOCK—6"x 9"



FOLDED—2½"x 6"

DIRECTIONS FOR FOUR-FOLD:

- a. Fold upper right corner to upper left corner.
- b. Fold these two corners to center crease.
- c. Cut and paste as before.

NOTE:—In each of these folders, it may seem desirable to paste magazine illustrations or other clippings in place of the cuttings indicated, or other uses may suggest themselves to the teacher. Careful folding and clean pasting should be expected.

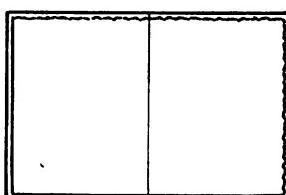
112. Booklet Folder

Rough gray cover paper, 1 piece, 6"x 9"

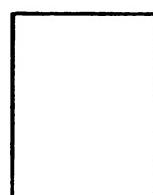
White book paper, 1 piece, 6"x 9"

Paste or glue

Soft or medium pencil



BOOK OPEN—SHOWING TORN EDGES



BOOK CLOSED—4½"x 6"

DIRECTIONS:

- a. Tear from $\frac{1}{4}$ " to $\frac{1}{2}$ " from two adjacent edges of the white paper, without measuring.
- b. Fold upper left corner of white paper to upper right corner.

BOOK PROBLEMS

- c. Fold upper left corner of cover paper to upper right corner.
- d. Run a little paste or glue along back of crease of white paper and press it inside of cover paper.
- e. Allow booklet to dry and use for sketching plants or animals or children, or for copying photographs.

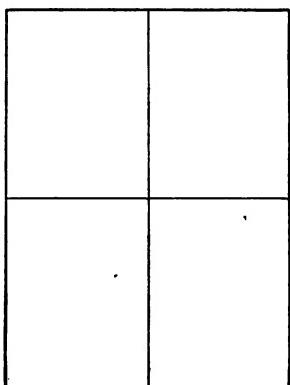
113. Pocket Note-Books

Rough cover paper, 3 pieces, 6" x 9"

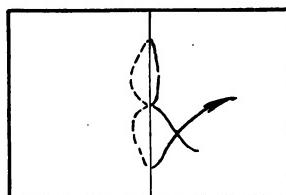
Print paper, 6 pieces, 9"x 12"

Coarse linen thread, 1 yard

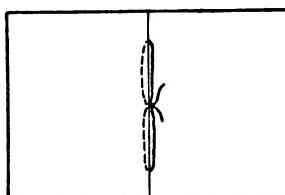
Large needle, letter opener or kitchen knife



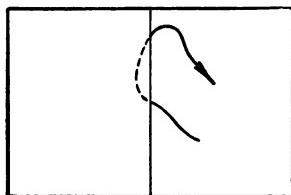
PRINT PAPER—9"x 12"
SHOWING FOLDS FOR 4 TO BOOK



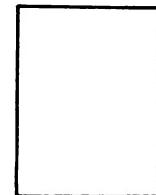
SECOND STEP IN SEWING



THIRD STEP IN SEWING



FIRST STEP IN SEWING

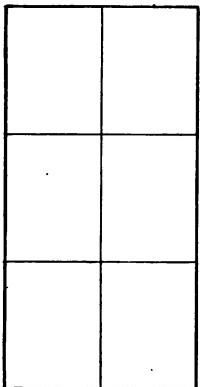


FINISHED NOTE-BOOK—4½"x 6"

PAPER AND CARDBOARD CONSTRUCTION

DIRECTIONS FOR QUARTO Book:

- a. Fold one piece print paper lower left corner to upper left corner.
- b. Fold upper left corner to upper right corner.
- c. Fold second piece of print paper in the same way and insert into first piece.
- d. Fold cover paper left to right and insert folded print paper.
- e. Sew down thru center of book, up near one end, down thru center again, up near opposite end, and tie square knot near the center.
- f. Tear leaves apart with letter opener, kitchen knife, or back of scissors.



PRINT PAPER FOLDED FOR 12 PAGES



INSIDE OF 12 PAGE BOOK
FOLDED AND SEWED



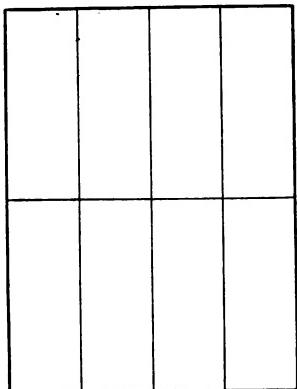
FINISHED BOOK
ABOUT 3"x 4"

DIRECTIONS FOR 12-PAGE Book:

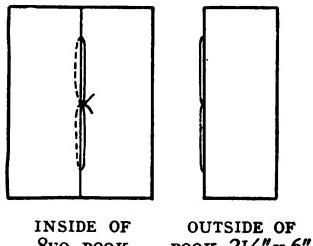
- a. Fold lower left corner of one piece print paper about two-thirds distance to upper left corner.
- b. Fold upper left corner to this crease and open paper flat.
- c. Fold upper right corner about two-thirds distance to upper left corner, make sharp crease, open, and tear off smaller piece.

BOOK PROBLEMS

- d. Refold larger piece and then fold left to right.
- e. Make a second piece like this and insert.
- f. Cut cover paper a little larger than open book, fold left to right, and sew print paper inside same as in 4to book.
- g. Tear leaves apart as before.



PRINT PAPER 9"x 12"
SHOWING FOLDS FOR 8VO BOOK



DIRECTIONS FOR OCTAVO Book—16 PAGES:

- a. Fold print paper right to left.
- b. Fold bottom to top.
- c. Fold left to right.
- d. Place one or two of these pieces in cover previously cut a little larger than open book.
- e. Sew and tie as before.
- f. Tear leaves apart.

NOTE:—These note-books may be used for writing practice, or for sketching, or for such purposes as seem desirable to the teacher in connection with any other subject.

PAPER AND CARDBOARD CONSTRUCTION

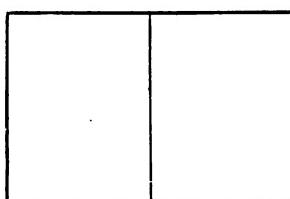
114. Book of Color Schemes

Colored rough cover paper, 1 piece, 6"x 9"

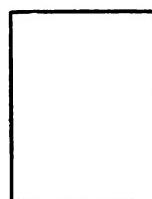
Gray cover paper, 2 pieces, 6"x 9"

Coarse linen thread or binders' thread, 14"

Large needle



BOOK OPEN 6"x 9"



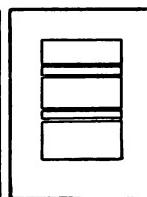
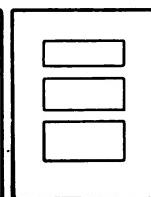
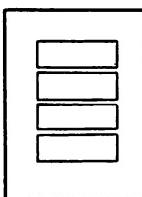
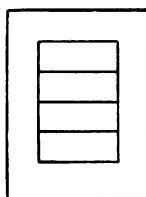
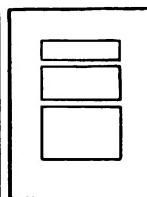
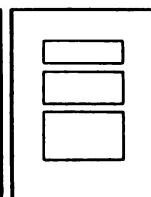
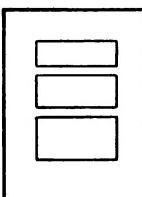
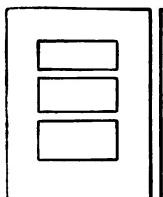
BOOK CLOSED



READY TO SEW



OPTIONAL METHOD



TYPICAL PAGES OF MOUNTED COLORS

DIRECTIONS:

- a. Fold gray paper inside of colored paper.
- b. Sew and tie as in number 113. If more space is wanted between pages, extra pieces of gray cover paper 1"x 6"

BOOK PROBLEMS

may be folded and sewed into the book, as shown at A.

- c. Mount rectangles of colored papers upon each inside page, so as to show good color schemes, keeping in mind both quality and quantity of each color.

NOTE:—Samples of fabrics or of different kinds of papers may be mounted in place of color schemes. The arrangements on the following page are suggested for mounting paper samples.

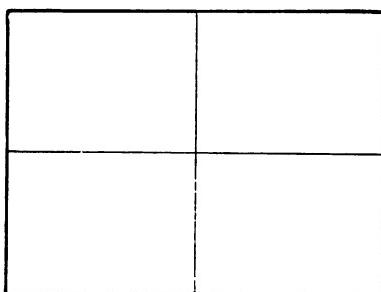
115. Drawing-Book

Gray cover paper, 1 piece, $4\frac{1}{2}'' \times 12''$

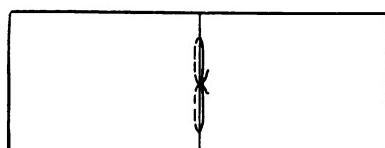
White book paper, 2 pieces, $9'' \times 12''$

Coarse linen thread, 15"

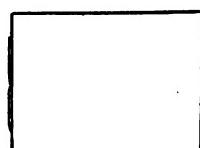
Large needle, pencil



BOOK PAPER $9'' \times 12''$



BOOK OPEN $4\frac{1}{2}'' \times 12''$

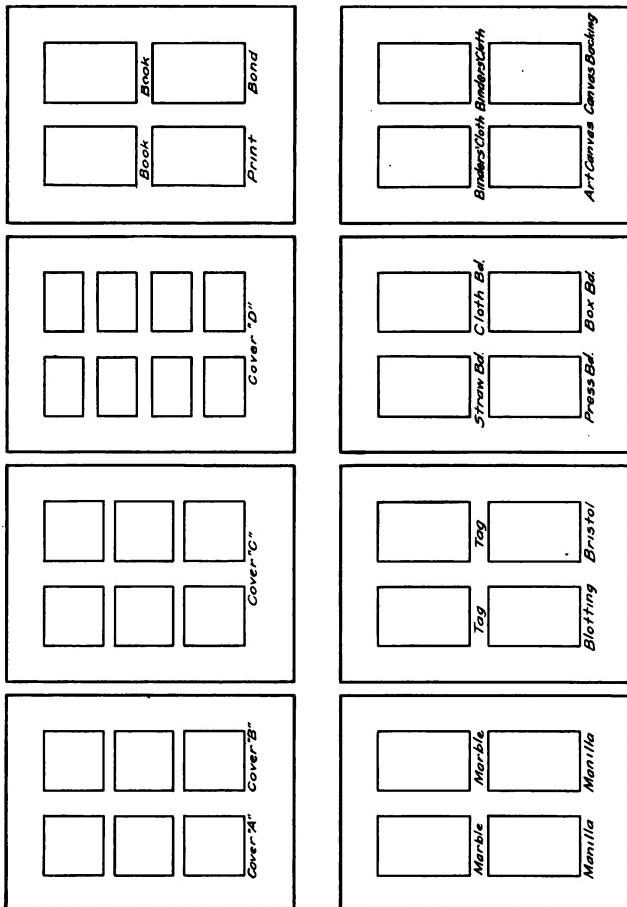


BOOK CLOSED

DIRECTIONS:

- a. Fold book paper bottom to top, having length of paper horizontal.
- b. Fold left to right.

PAPER AND CARDBOARD CONSTRUCTION



PAGES OF MOUNTED PAPER SAMPLES

BOOK PROBLEMS

- c. Fold cover paper left to right.
- d. Place book paper inside of cover paper.
- e. Sew and tie as in number 113.

NOTE:—Use for drawings:—flowers, grasses, fruits, vegetables or small objects.

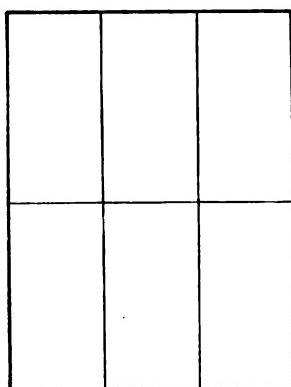
116. Laundry List

Manila paper, 2 pieces, 9"x 12"

Silk cord, 8"

Eyelet

Eyelet punch, letter opener, pencil



MANILA PAPER 9"x 12"



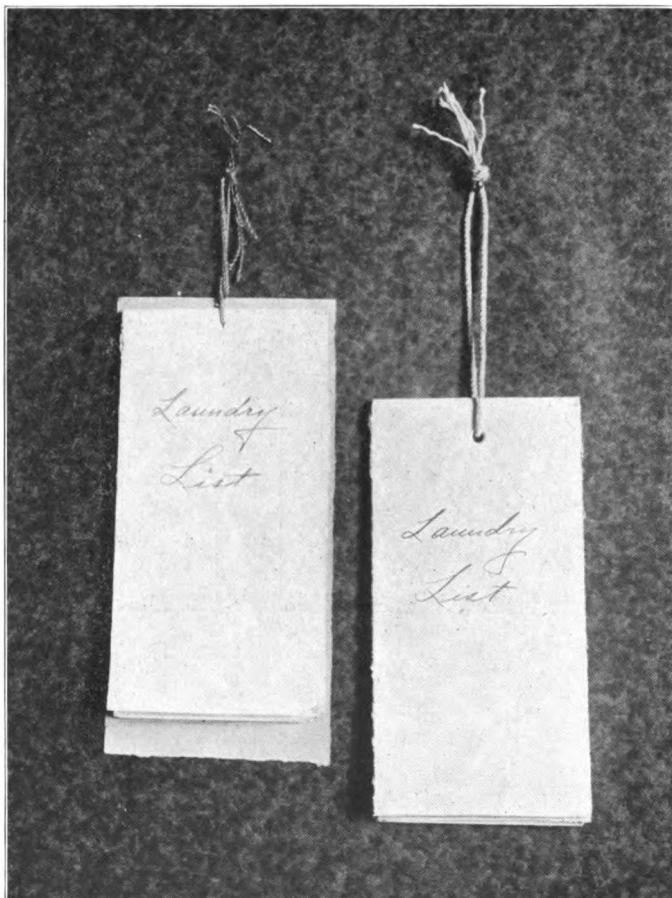
FINISHED LIST

DIRECTIONS:

- a. Fold two pieces manila paper with right edge two-thirds distance to left edge.
- b. Fold left edge to crease.
- c. Fold top to bottom.
- d. Fasten eyelet near center of top.
- e. Tie loop of cord thru eyelet for hanging.
- f. Tear leaves apart with letter opener.
- g. Write "Laundry List" upon outside.

PAPER AND CARDBOARD CONSTRUCTION

NOTE:—Use to record articles sent to the laundry so as to check up proper return. Other uses than as Laundry List may be suggested and the name changed accordingly.



LAUNDRY LISTS

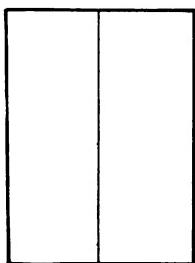
BOOK PROBLEMS

211. Paper Portfolio

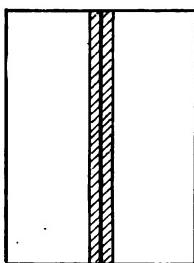
Cover paper or press board, 1 piece, 6"x 9"

Stay tape, 1 piece, 9" long

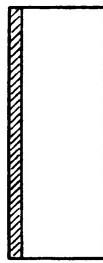
Scissors, pencil, rule



COVER PAPER 6"x 8"
CUT FROM 6"x 9"



TAPE ON BACK
OF PORTFOLIO

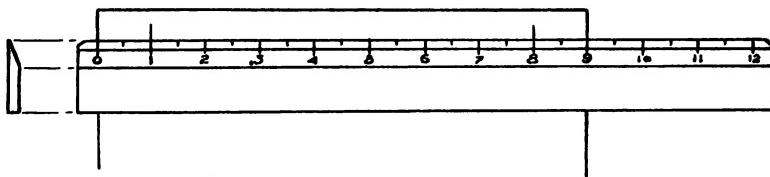


FRONT COVER
3"x 8"

DIRECTIONS:

- a. Lay out cover paper 6"x 8", and cut to size. Measure from lower corner and mark each edge of paper, connect marks, cut to line.
- b. Fold left to right.
- c. Stick stay tape over fold and cut ends even with top and bottom of portfolio.

NOTE:—This may be used for carrying folded letter paper, or clippings, or school work. It is a convenient size for the pocket. By making the folder from 9" square stock, it will be $4\frac{1}{2}$ " x 9", suitable for carrying a large variety of folded papers. It may seem desirable to make both sizes.



It is best to begin measuring from a clear mark a little distance from edge of rule, if such rules be available, as indicated in the sketch. It is best also to make all measurements in one

PAPER AND CARDBOARD CONSTRUCTION

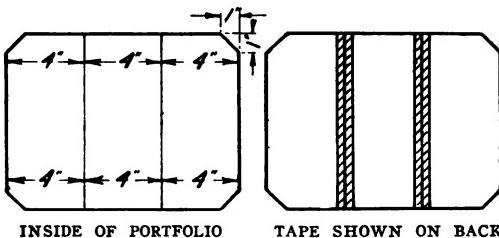
direction without moving the rule, so as to avoid multiplying errors. In the sketch measurements are 1", 7", and 1", beginning at left edge. Pupils must be kept on their guard in adding the smaller measurements.

212. Paper Portfolio with Laps.

Heavy cover paper, 1 piece, 9"x 12".

Stay tape, 1 piece, 19" long.

Rule, pencil, scissors.



DIRECTIONS:

- a. Lay out three 4 inch measurements across top and bottom of 9"x 12" cover paper, and connect these with straight lines.
- b. Set off 1 inch measurements from each corner, and connect across corners as shown in drawing.
- c. Cut off corners.
- d. Fold right edge nearly to first line.
- e. Fold left edge nearly to this crease.
- f. Unfold and stick pieces of stay tape over creases along the back of portfolio.

NOTE:—This is to be used for the same purpose as number 211 but has the advantage that it holds papers more securely.

213. Book of Designs.

Gray cover paper, 3 pieces, 6"x 9".

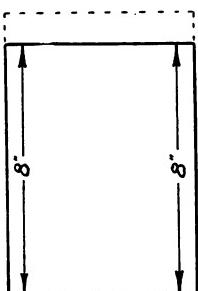
White book paper, 1 piece, 9"x 12".

Coarse linen thread, 18".

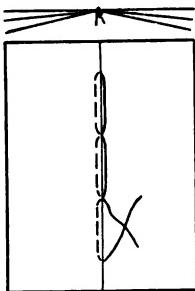
Paste.

Scissors, rule, pencil, needle.

BOOK PROBLEMS



COVER PAPER 6"x 9"
LAID OUT 6"x 8"



INSIDE OF BOOK
READY TO TIE



COVER OF
BOOK—3"x 8"

DIRECTIONS:

- a. Lay out each piece of cover paper 8 inches up from bottom edge and cut to 6"x 8".
- b. Fold left to right and place two pieces inside of third, which will serve as cover.
- c. Sew down a little distance below center, up a little distance above center, down near top, up thru second hole, down thru first hole, up near bottom.
- d. Tie square knot at first hole.

NOTE:—Cut units of design suitable for borders or "all over" repeat patterns from white paper and paste in the book when complete. Front cover of book may have a small unit of design mounted just above the center, or pupil may print DESIGN on the cover, or a printed label may be fastened on with paste.

214. Weather Record.

India tint book paper, 2 pieces, 6"x 9".

Black plain cover paper, 1 piece, 3"x 6".

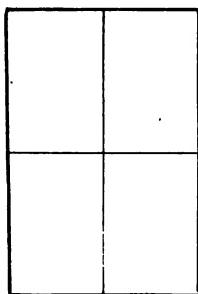
Dark blue cover paper, 1 piece, 3"x 6".

White book paper, 1 piece, 3"x 6".

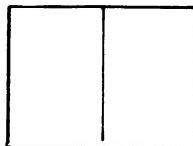
Paste.

Scissors, needle.

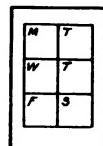
PAPER AND CARDBOARD CONSTRUCTION



BOOK PAPER—6"x 9"



BOOK OPEN



INSIDE PAGE

DIRECTIONS:

- a. Fold bottom to top.
- b. Fold left to right.
- c. Sew as in number 113.
- d. Cut standard weather flags from blue and black plain cover paper, and from white book paper.
- e. Paste one of each kind of flag upon front cover of book.

NOTE:—Save the extra flags for inside of book to indicate the weather for any given week or more. The proper flag for a day may be pasted in its proper square in the afternoon. Government flags are displayed from 10:00 a. m. until sunset, to indicate the weather for the following day. The weather signals are as follows:

White flag—clear and fair weather.

Blue flag—rain or snow.

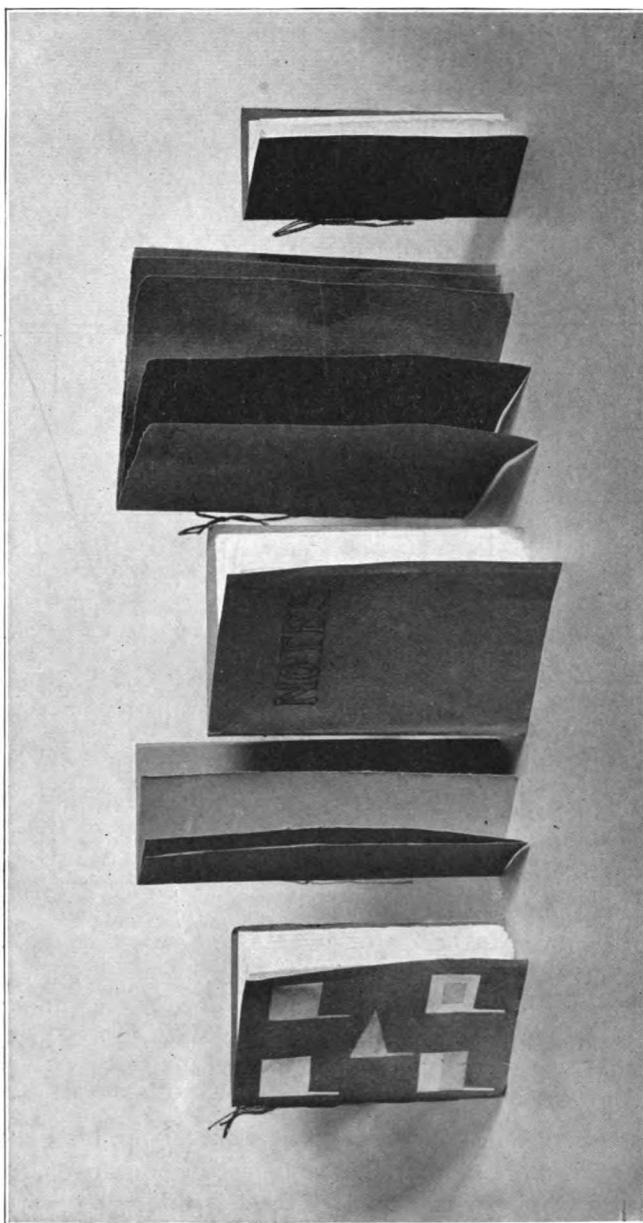
Black triangular flag—temperature signal, indicating rising temperature when placed above another flag, and falling temperature when placed below.

White and blue striped flag—local showers.



COVER

PROBLEMS IN BOOKLET MAKING



PAPER AND CARDBOARD CONSTRUCTION

215. Receipt-Book.

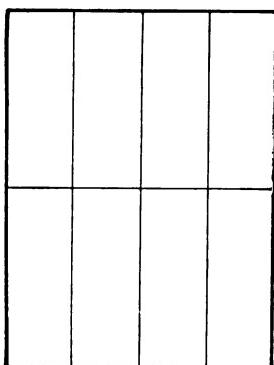
Cover paper, 1 piece, 6"x 9".

Bond paper, 2 pieces, 9"x 12".

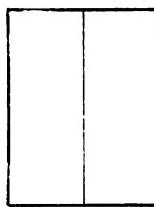
Binders' cloth, 1 piece, 1" x 9".

Silk floss, 15".

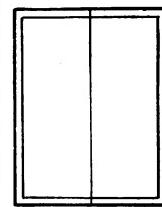
Scissors, needle, pencil.



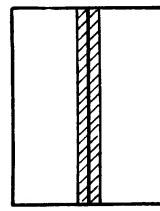
BOND PAPER—9"x 12"



COVER PAPER



PAPER IN COVER



BACK OF COVER

DIRECTIONS:

- a. Fold bond paper right to left, bottom to top, left to right.
- b. Lay out and cut cover 5"x 6½".
- c. Fold cover left to right.
- d. Sew bond paper into cover, one section inside of the other.
- e. Cut strip of binders' cloth 1"x 6½" and glue on back of book to cover sewing.
- f. Letter the front cover COOKING RECEIPTS.

NOTE:—Stay tape may be used in place of the binders' cloth but it is a bit more clumsy. A more useful book may be made if three or four sheets of paper are used, making 48 or 64 pages.

BOOK PROBLEMS

216. Note-Book.

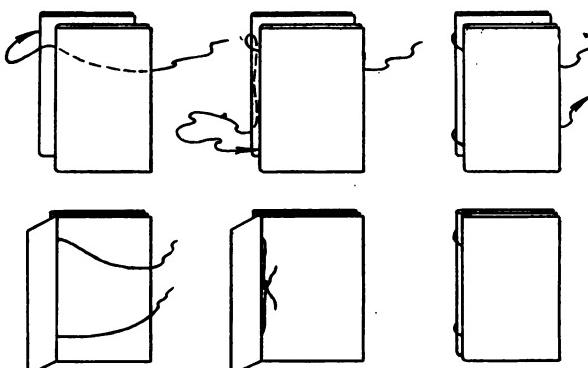
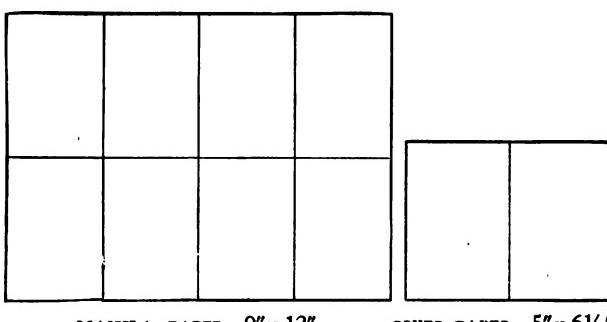
Cover paper, 1 piece, 6"x9".

Manila paper, 2 pieces, 9"x12".

Linen thread, 24".

Glue.

Scissors, needle, pencil.



STEPS IN SEWING TWO SECTIONS

PAPER AND CARDBOARD CONSTRUCTION

DIRECTIONS:

- a. Fold manila paper right to left, bottom to top, left to right.
- b. Lay out and cut cover $5'' \times 6\frac{1}{2}''$, and fold as shown.
- c. Sew the two sections of the book together starting above the center of one section, and following steps shown in cut, fastening ends with square knot.
- d. Spread glue along inside crease of cover, one-half inch wide.
- e. Press book into cover.
- f. Write or print NOTES upon front cover.

NOTE:—This is the first problem involving the sewing of sections together in bookbinding. The process has been simplified to the easiest steps possible. Problems following this have also been modified to suit conditions of the usual class room without extensive equipment.

217. Paged Blank Books.

OCTAVO SIZE

White book paper, 1 piece, $9'' \times 12''$.

Heavy cover paper, 1 piece, $6'' \times 9''$.

Thread, 15".

Needle, scissors, pencil.

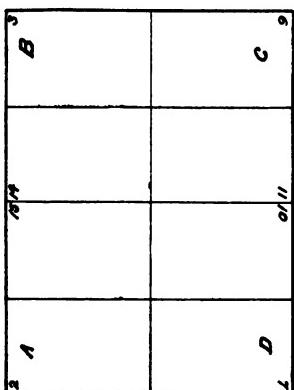
DIRECTIONS:

- a. Letter sheet,—A, B, C, D, as indicated in drawing.
- b. Place sheet in position so that A B will be at top of paper and C D at the bottom.
- c. Fold right to left.
- d. Fold bottom to top.
- e. Fold left to right.
- f. Open sheet and place in original position,—A B at the top.
- g. Place numbers for pages on front of sheet as indicated in the drawing.
- h. Turn sheet over so that D is under upper left hand

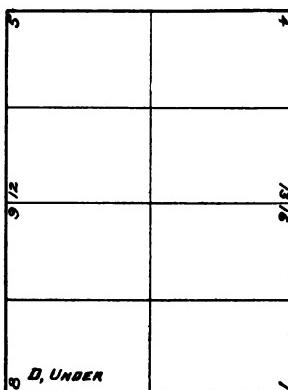
BOOK PROBLEMS

corner and write numbers as indicated in second drawing.

- i. Fold sheet again in the same way that it was first folded.



FRONT OF SHEET



BACK OF SHEET

- j. Cut cover $5'' \times 6\frac{1}{2}''$ and fold.
- k. Insert folded sheet in cover, sew, and tie.
- l. Tear leaves with paper knife or back of scissors.

NOTE:—Sheet must be folded the same in "i" as it was folded in "c," "d," "e," or the paging will not be correct.

DUODECIMO SIZE BLANK BOOK

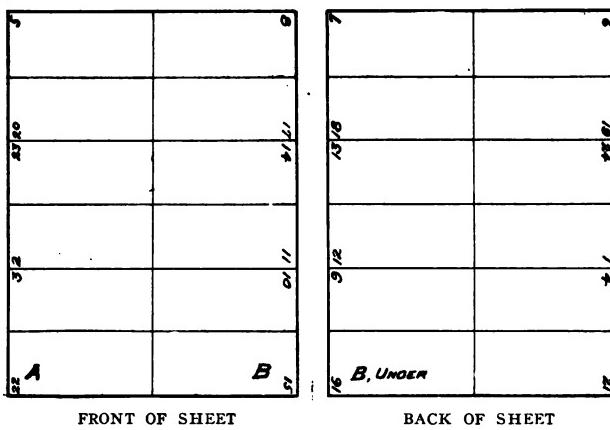
Heavy cover paper, 1 piece, $6'' \times 9''$.

White book paper, 1 piece, $9'' \times 12''$.

Thread, 15".

Needle, scissors, pencil.

PAPER AND CARDBOARD CONSTRUCTION



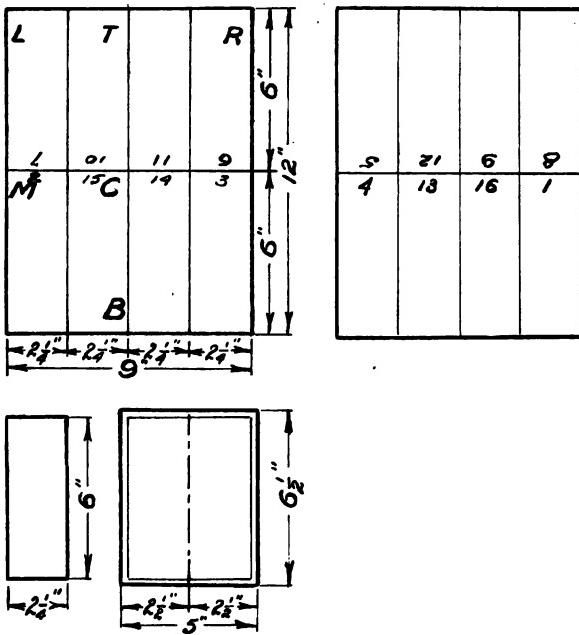
DIRECTIONS:

- a. Place paper on desk with A B at bottom.
- b. Fold bottom edge up two-thirds distance to top.
- c. Fold top edge down to fold.
- d. Fold right edge to left edge.
- e. Fold bottom to top.
- f. Unfold sheet and place in such a position that A is in the upper left hand corner, and B in the lower left hand corner.
- g. Number pages as indicated in drawing.
- h. Reverse sheet so that B will be under the upper left hand corner and A under the lower left hand corner.
- i. Number pages on back of sheet as indicated in drawing.
- j. Refold sheet in same manner as it was first folded.
- k. Cut cover $4\frac{1}{2}'' \times 5''$ and fold.
- l. Insert folded sheet in cover and sew as before.

NOTE:—These problems furnish opportunity for the teacher to explain to the pupils how a book is printed, folded, sewed, trimmed, and bound. Booklets with 16, 18, 32, 36, or 48 pages may be worked out as supplementary problems. The printer usually prefers to fold into 8, 16, or 32 pages in order that the

BOOK PROBLEMS

folding may be done from edge to edge. Some of the other foldings and pagings are given below. The stock for each book is 9"x 12" and a cover is planned to allow $\frac{1}{2}$ " projection.

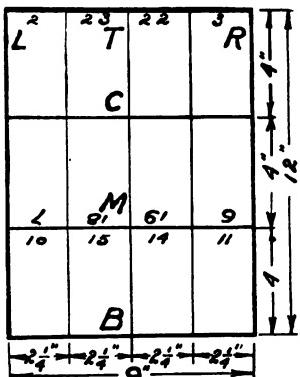


SECTION OF 16 PAGES

A section of 16 pages may be made by folding R to L, T to B, M to C.

The illustration shows the paging on both sides of the sheet.
In the two lower drawings are shown a single page and the open book in its cover.

PAPER AND CARDBOARD CONSTRUCTION



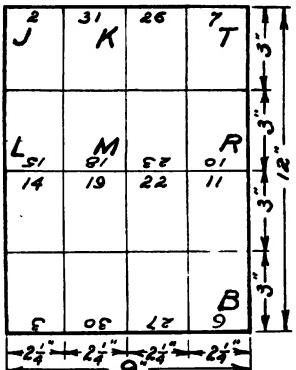
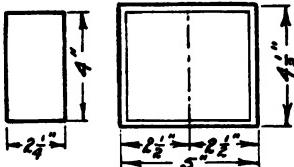
4	21	29	1
5	28	41	8

SECTION OF 24 PAGES

A section of 24 pages may be made by folding R to L, M to T, B to C, L to T.

This is a difficult fold and not often employed. A

printer would more commonly use two sheets, one of 16 pages and one of 8 pages.



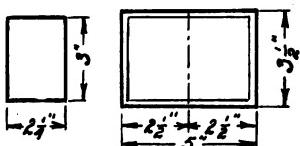
8	25	32	1
6	28	41	91

SECTION OF 32 PAGES

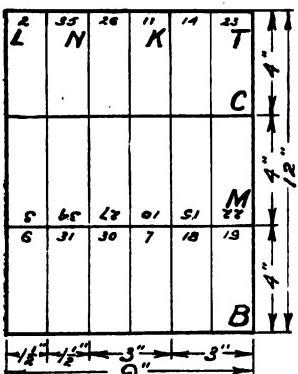
A section of 32 pages may be made by folding B to T, R to L, M to K, J to K.

This is as many pages as usually fold well together in

a single section, altho thin book paper may sometimes be folded into 64 pages or more in pamphlet work.



BOOK PROBLEMS



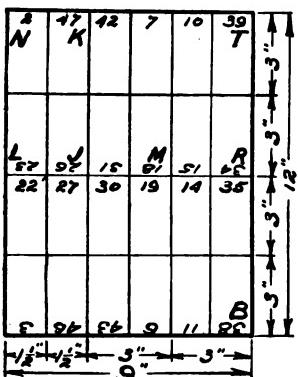
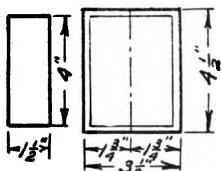
24	13	14	25	36	1
17	91	5	87	58	6
20	17	8	29	32	5

SECTION OF 36 PAGES

A section of 36 pages may be made by folding M to T, B to C, K to L, T to N, L to N.

In place of this sized section it is more practical to fold

two sections of 16 pages and one of 4 pages. The practice here in careful folding, however, is worth the attempt at 36 pages in school.



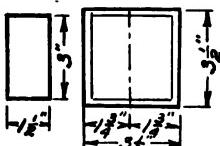
40	9	8	41	48	1
55	91	41	25	57	47
36	13	20	29	28	21

SECTION OF 48 PAGES

A section of 48 pages may be made by folding B to T, M to L, R to J, J to K, N to K.

Three sections of 16 pages each, or one of 32 pages

and one of 16 pages are more generally used by printers.



PAPER AND CARDBOARD CONSTRUCTION

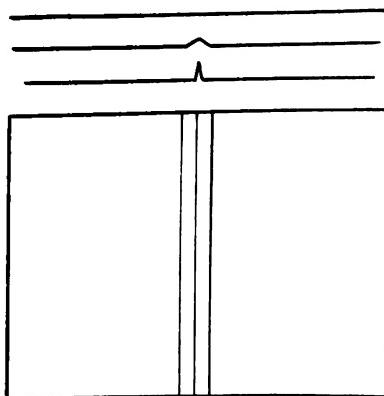
311. Scrap-Book.

Colored cover paper, 1 piece, 9"x 12".

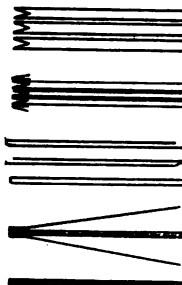
Gray cover paper, 3 pieces, 9"x 12".

Glue.

Rule, pencil, scissors.



GRAY COVER PAPER READY TO FOLD



STEPS IN
ASSEMBLING
SCRAP-BOOK

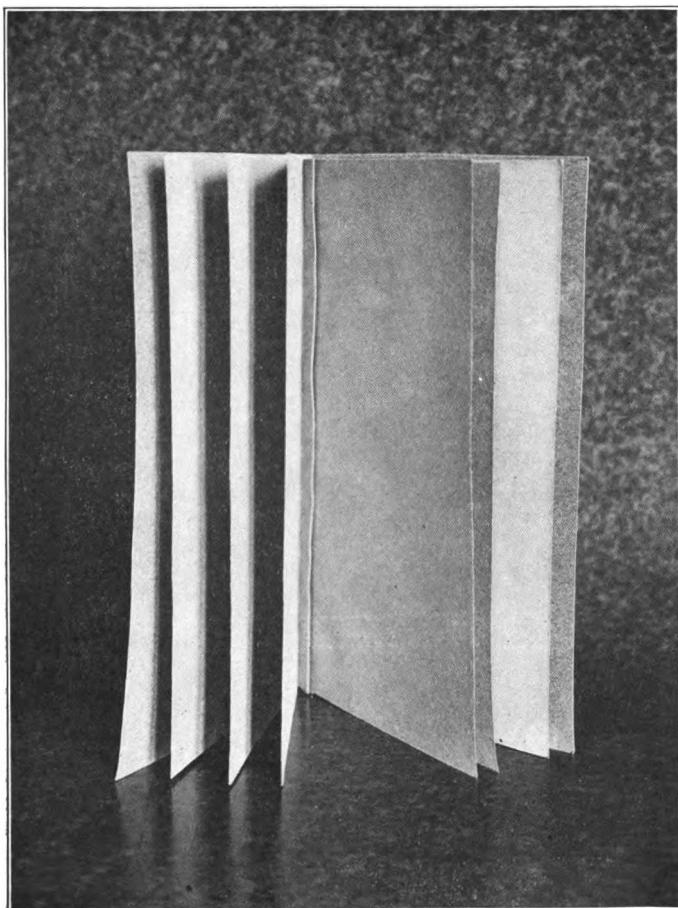
DIRECTIONS:

- a. Lay out three pieces gray cover paper like sketch, center lines to be $\frac{1}{2}$ " apart and finished pages $5\frac{1}{2}" \times 9"$. These are for the leaves of the scrap-book.
- b. Fold left edge towards right, creasing along the left of the three center lines, and unfold.
- c. Fold right edge towards left, creasing at right line, and unfold.
- d. Turn paper over and fold left edge to right edge.
- e. Lay out and cut colored cover paper $9" \times 11\frac{1}{2}"$. This is for the cover of the scrap-book.
- f. Fold left edge of cover nearly to the right edge (allow about $\frac{1}{2}"$) and unfold. See third drawing from the top at right.
- g. Fold right edge nearly to the left and unfold.

BOOK PROBLEMS

- h. Glue leaves into cover, spreading glue for nearly half an inch along the inner edge of cover and press. See two lower drawings at the right.

NOTE:—This book may be used for mounting magazine clip-



SCRAP-BOOK

PAPER AND CARDBOARD CONSTRUCTION

pings or pictures illustrative of school work. The covers may be made to open more freely if an extra piece of cover paper 1"x 9" be inserted at front and back as shown in second drawing from the top at the right.

312. Small Sewed Pamphlet.

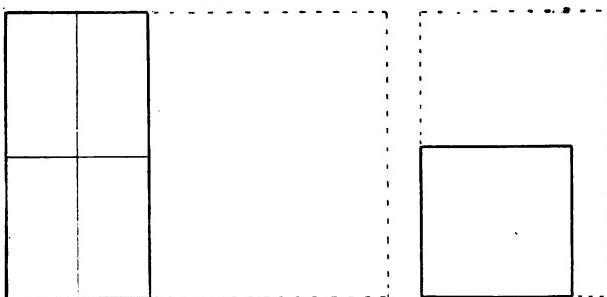
Book paper, 3 pieces, 9"x 12".

Cover paper, 1 piece, 6"x 9".

Binders' thread, 30".

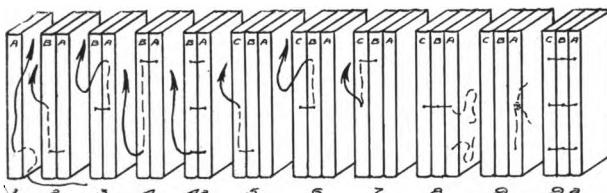
Glue.

Rule, scissors, pencil, needle.



ONE SECTION BOOK PAPER $4\frac{1}{2}'' \times 9''$
CUT FROM $9'' \times 12''$

COVER $4\frac{3}{4}''$ SQUARE
CUT FROM $6'' \times 9''$



STEPS IN SEWING—4a AND 9a SHOW APPEARANCE WHEN TWO SECTIONS AND
THREE SECTIONS ARE COMPLETELY SEwed

DIRECTIONS:

- a. Lay out and cut three pieces book paper $4\frac{1}{2}'' \times 9''$ from $9'' \times 12''$, saving the larger pieces for another pamphlet.
- b. Fold bottom to top and left to right.

BOOK PROBLEMS

- c. Sew as shown in steps 1-8, beginning inside of section A, sewing across the back of sections A and B near the bottom, into section B, out thru the middle of the back of section B, and continue as illustrated, finishing by carrying the thread into the middle of section A, shown at "8", and tying to the starting thread with a square knot.
- d. Cut cover $4\frac{3}{4}$ " square, fold as in number 311, glue edge of sections into cover, and press.
- e. Put simple line design on front cover.

NOTE:—Step marked 4a shows the appearance after step 4 has been completed. Step 9a shows the appearance after step 9 has been completed.

Other sections may be added to these if desired in the same manner as C is added to B in step 5.

A larger pamphlet may be made in the same manner as above, but bringing in an extra stitch to each section, and using the pieces cut off from the stock for the small pamphlet. The following materials are required:

Book paper, 6 pieces, 9"x 12".

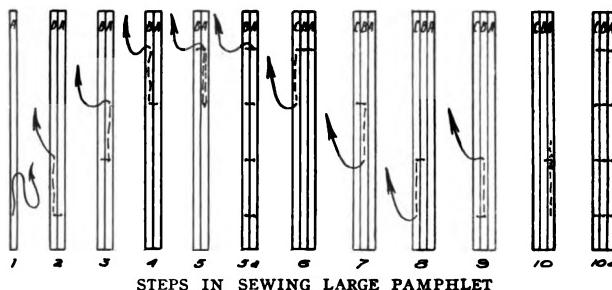
Book paper, 3 pieces, $7\frac{1}{2}$ " x 9", left from small pamphlet.

Cover paper, 1 piece, 9"x 12".

Binders' thread, 48".

Glue.

Rule, pencil, scissors.

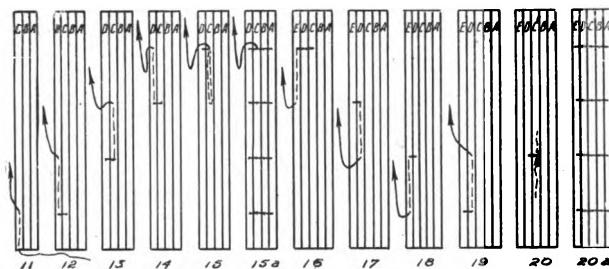


PAPER AND CARDBOARD CONSTRUCTION

Lay out and cut six pieces book paper $7\frac{1}{2} \times 9"$, and use the three additional pieces left from the small pamphlet.

Fold, sew, glue, and letter as in small pamphlet, using three pieces of paper to each section.

NOTE:—A thicker pamphlet may be made by adding extra pages as shown in the following drawing:



TWO SECTIONS ADDED TO LARGER PAMPHLET

313. Sewed Pamphlet with Reinforced Back.

Heavy cover paper, 1 piece, $6" \times 9"$.

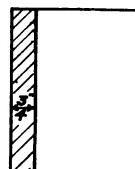
White book paper, 3 pieces, $6" \times 9"$.

Binders' cloth, 1 piece, $1\frac{1}{2} " \times 6"$.

Thread, 20".

Glue.

Rule, pencil, scissors, needle.



FRONT COVER
 $4" \times 6"$

DIRECTIONS:

- a. Cut heavy cover paper $6" \times 8"$ for cover, and fold to $4" \times 6"$.
- b. Cut three pieces white book paper for leaves, $5\frac{1}{2} " \times 7\frac{1}{2} "$.
- c. Fold each piece to $3\frac{1}{8} " \times 5\frac{3}{4} "$.
- d. Sew leaves together same as in number 312.
- e. When leaves are sewed and fastened in cover, glue strip of binders' cloth around back of pamphlet and place under weight until dry.

BOOK PROBLEMS

314. Cloth Covered Portfolio.

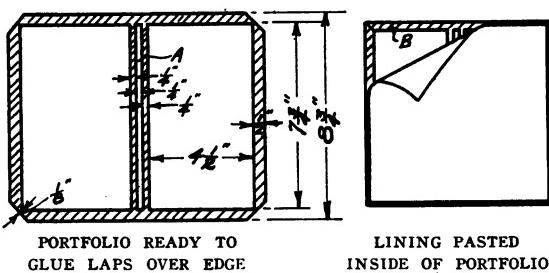
Strawboard, 2 pieces, $4\frac{1}{2}'' \times 7\frac{3}{4}''$, cut from $6'' \times 9''$.

Binders' cloth, 1 piece, $9'' \times 12''$.

Marble paper, 1 piece, $9'' \times 12''$.

Glue, paste.

Rule, scissors, pencil.

**DIRECTIONS:**

- a. Cut binders' cloth $8\frac{3}{4}'' \times 10\frac{3}{4}''$.
- b. Locate pieces of strawboard on binders' cloth, leaving $\frac{3}{4}''$ between them as indicated on the drawing and draw line around each piece.
- c. Spread a thin coat of glue or paste on one side of binders' cloth and press strawboard firmly into place on the cloth. In applying glue, use thin piece of soft wood or stiff piece of cardboard. Paste will be found easier to use.
- d. Cut off corners of binders' cloth leaving $\frac{1}{8}''$ to fold up over the corner of the strawboard.
- e. Glue strip of scrap paper in the middle of back as indicated at A, $\frac{1}{4}'' \times 7\frac{3}{4}''$.
- f. Spread glue on edges of cloth and fold over strawboard, —see B. Do not use paste here.
- g. Cut marble paper $7\frac{1}{2}'' \times 9\frac{1}{2}''$ for lining.
- h. Paste in place over strawboard. While paste is drying press firmly in grooves.

PAPER AND CARDBOARD CONSTRUCTION

NOTE:—This portfolio is to be used in carrying folded papers. It is a first step in case making for bookbinding. The small sewed pamphlet, number 312, involves the sewing of several sections, and the cloth bound book, number 316, shows the fastening of the sections into the case.

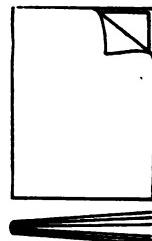
315. Glued Booklet.

Heavy cover paper, 1 piece, 6"x 9".

White book paper, 4 pieces, 6"x 9".

Glue.

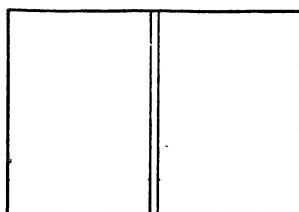
Rule, pencil, scissors.



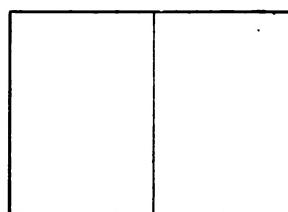
DIRECTIONS:

- a. Cut 4 pieces book paper $5\frac{3}{4}'' \times 8\frac{3}{4}''$.
- b. Fold cover to $4\frac{1}{2}'' \times 6''$.
- c. Fold leaves to fit cover.
- d. Run a little glue on the folded edge of one of the folded sections and insert it in the cover. Repeat the process with the other sections, placing each one in the preceding one.
- e. Keep folded and place under a weight until glue is dry.

NOTE:—Several sections of book paper may be placed side by side, instead of one in the other, and then all glued into a double creased cover as here illustrated.



BOOK PAPER, 6"x 8 $\frac{3}{4}$ "



COVER PAPER, 6"x 9"

BOOK PROBLEMS



316. Cloth Bound Book.

Cloth board, 1 piece, 9"x 12".

Binders' cloth, 1 piece, 9"x 12".

Cover paper, 2 pieces, 9"x 12".

Canvas for backing, 1 piece, 3"x 9".

Print paper, 1 piece, $\frac{3}{8}$ "x 9", 1 piece, $\frac{1}{2}$ "x 9", 20 pieces, 9"x 12". Instead of 20 pieces of print paper 9"x 12", anywhere from 9 to 36 pieces may be used according to thickness desired and time available. This will provide for from three to six sheets to a section, and from three to nine sections.

Glue and paste.

Binders' thread, 60". To be varied for a greater or less number of sections.

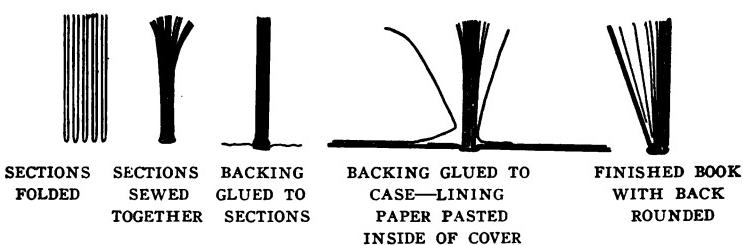
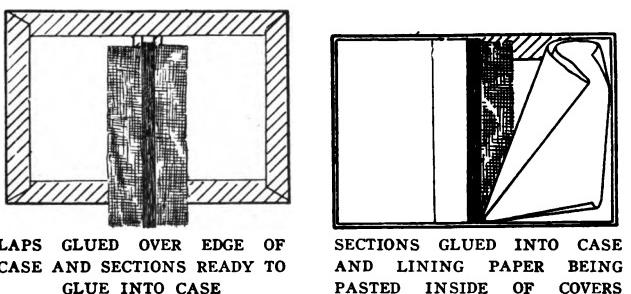
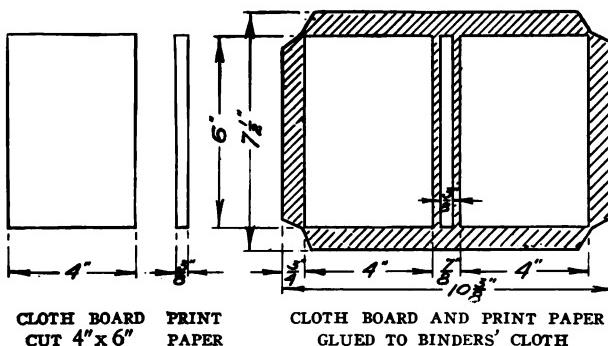
Rule, pencil, scissors, needle, knife, cutting-board.

A piece of binders' board 9"x12", or 11"x14", will be found satisfactory for a cutting-board.

DIRECTIONS:

- a. Make case for book same as number 314, omitting the marble paper used for lining. For size see page 50.
- b. Lay out and cut 9 or more pieces of print paper $5\frac{3}{4}$ "x 8", and fold to 4"x $5\frac{1}{4}$ ".
- c. Put three or four sheets to a section, one folded inside of the other, and sew the sections together as in number 312. If larger paper be used, fold it as illustrated in number 217 on pages 37 to 41.

PAPER AND CARDBOARD CONSTRUCTION

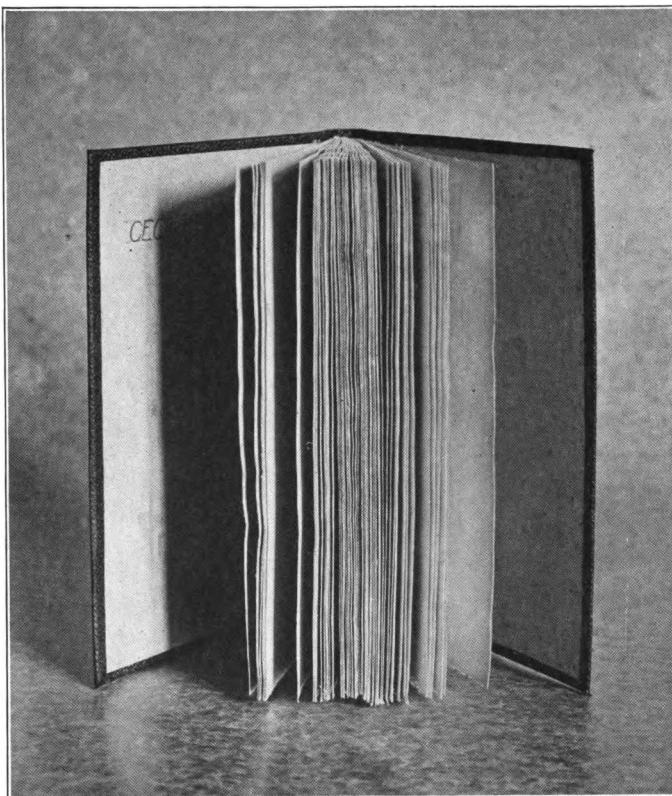


- d. Glue strip of canvas backing, cut to $2\frac{1}{2}'' \times 6''$, against sewed edges and press the $\frac{1}{2}''$ strip of paper against the glue as it is forced thru the canvas. Allow to dry with paper attached as shown above. See third drawing in bottom row.
- e. When dry (next day) glue these canvas projections to the inside of covers. Press firmly with one hand

BOOK PROBLEMS

against a piece of scrap paper while holding the leaves of the book straight up from the covers.

- f. Insert a piece of scrap paper between covers and end



CLOTH BOUND BOOK

sheets at both front and back of book, close the book, and put under pressure for a few minutes, or until next day. Be sure the back of the book is smoothly rounded.

PAPER AND CARDBOARD CONSTRUCTION

- g. Cut two pieces of cover paper for lining, $5\frac{3}{4}'' \times 7\frac{3}{4}''$, or of such size as will fit properly, and paste against inside of cover and for a quarter of an inch up against the end leaves of book. Put under pressure of heavy books or into a letter press.
- h. When dry, the outside of front cover may be decorated by a simple outline in water color.

NOTE:—Writing paper, drawing paper, or manila paper may be used in place of print paper, and any number of sections may be used, or several printed pamphlets may be sewed together. Economy of material and ease of manipulation will require that not over three or four sheets be put into a section and that not over five sections be used.

If hand screws or vises be available, the back of the book may be rounded with a hammer as shown in the illustration at the right of the lower row on page 50. This form can be suggested by working with the fingers. It provides a place for the sewing, and allows the covers to lie evenly.

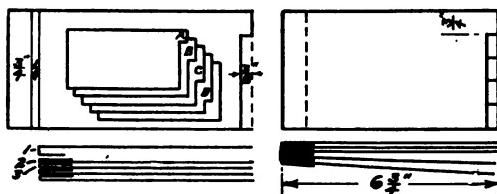
It may seem desirable to start with a smaller book and make two books, or to omit the larger book altogether.

411. Pocket Paper File.

Medium tag board, 2 pieces, $9'' \times 12''$.

Glue.

Rule, scissors, pencil.

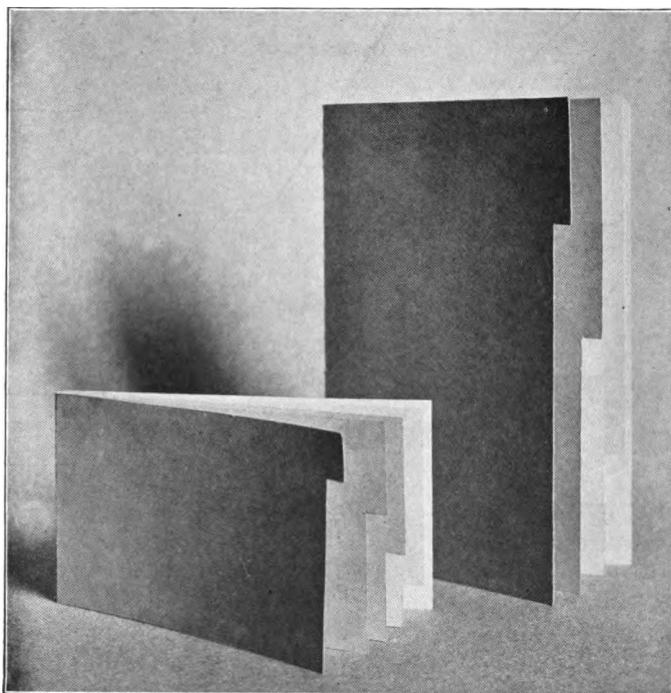


STEPS IN MAKING POCKET PAPER FILE

BOOK PROBLEMS

DIRECTIONS:

- a. Cut 5 pieces of tag board, each $3\frac{3}{4}'' \times 7\frac{3}{4}''$.
- b. Lay out and cut tabs, A, B, C, D,—as indicated in the small scale drawing on front cover at left on page 52. Each tab is to be made $\frac{3}{4}''$ longer than the one above it.



TAG BOARD PAPER FILES

- c. Fold one piece for the cover as indicated in the lower drawing at the left,—1.
- d. Fold the other three pieces as shown in the lower drawing,—2 and 3.
- e. Glue folded part of No. 2 into No. 1; folded part of No. 3 to No. 2, and so on until all are glued together.
- f. Fold the top piece around the others and glue.

PAPER AND CARDBOARD CONSTRUCTION

NOTE:—Measuring, folding, and gluing must be accurately and carefully done or the edges of the finished file will not be even. The photograph shows the pocket paper file and also the next problem—the desk paper file.

412. Desk Paper File.

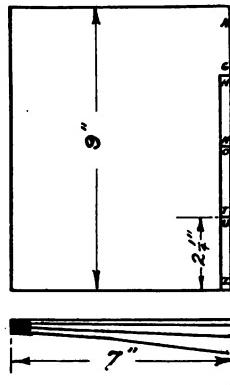
Heavy tag board, 4 pieces, 9"x 12".

Glue.

Rule, pencil, scissors.

DIRECTIONS:

- a. Cut 4 pieces $8\frac{1}{2}'' \times 9''$.
- b. Lay out and cut tabs in same manner as in number 411. Tabs are to be made $\frac{3}{8}''$ wide and $2\frac{1}{4}''$ long.
- c. Fold each sheet 7" from tab edge. The top sheet which is to fold around the others will require a second fold the same as in number 411.
- d. Letter or number the tabs to be used for markers. One suggestion is given in the above drawing.
- e. Glue together and put under a heavy pressure. Follow the same order as in number 411.



DESK PAPER FILE

413. Note-Book Covers.

A. END OPENING COVER

Strawboard, 2 pieces, 6"x 9".

Binders' cloth, 2 pieces, 3"x 6".

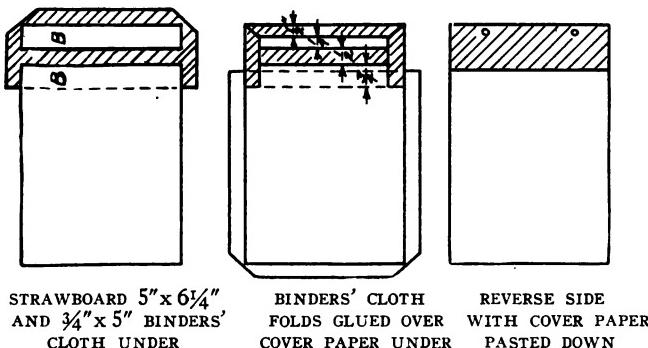
Heavy cover paper, 2 pieces, 6"x 9".

Marble paper, 2 pieces, 6"x 9".

Glue, paste, eyelets.

Rule, pencil, scissors, eyelet punch, knife.

BOOK PROBLEMS



DIRECTIONS FOR FRONT COVER:

- a. Cut one piece of strawboard $5'' \times 7''$ and cut strip from end $\frac{3}{4}'' \times 5''$. These two pieces are to be fastened to binders' cloth as shown in the first drawing.
- b. Cut one piece of binders' cloth $2\frac{1}{2}'' \times 6''$. This is to be used as a hinge for the front cover.
- c. Place the two pieces of strawboard $\frac{1}{2}''$ apart over binders' cloth as shown at B B. Draw lines on cloth to indicate exact position of pieces of strawboard and cut corners as illustrated.
- d. Spread paste or glue on binders' cloth where it is needed to fasten to boards. Use a brush for paste or a clean piece of wood with a chisel edge for glue.
- e. Place pieces of strawboard as indicated by the lines on the cloth and press firmly. Put in press if one is available.
- f. Apply glue to edge of cloth and fold over the strawboard. Put under weight until glue is set.
- g. Cut one piece of heavy cover paper $6'' \times 7''$. This is for the outside of front cover.
- h. Apply paste to heavy cover paper and set in place on the strawboard. See second drawing above.
- i. Fold edges over strawboard and fasten with paste or glue. Outside of cover is shown in third drawing above.

PAPER AND CARDBOARD CONSTRUCTION

- j. Cut one piece of marble paper $4\frac{3}{4}'' \times 7\frac{1}{4}''$. This is a lining to the front cover.
- k. Paste marble paper in place. This should extend over the edges of the cover paper and to $\frac{1}{8}$ " from edge of boards.
- l. Punch holes and set eyelets near the edge. This is shown in the drawing at the right.

NOTE:—The back of the note-book cover is made in the same manner as the front except that the strawboard is in one piece and there is no hinge. If desired the back can be made hinged the same as the front. To do this it is necessary to have two strips of strawboard as at B instead of one.

The back must be made the full size of the front, including hinged end.

B. SIDE OPENING NOTE-BOOK COVER

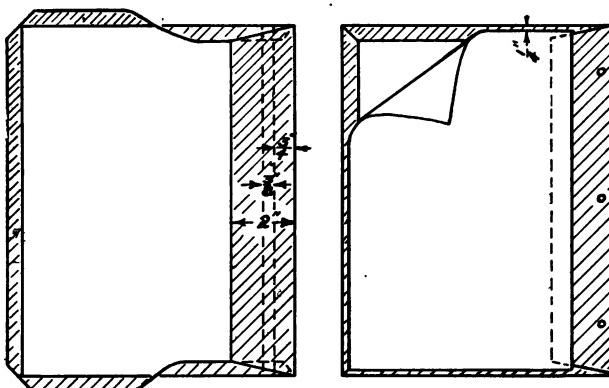
Strawboard, 2 pieces, $8'' \times 10\frac{3}{4}''$, cut from $9'' \times 12''$.

Binders' cloth, 2 pieces, $12'' \times 12''$.

Marble paper, 2 pieces, $9'' \times 12''$.

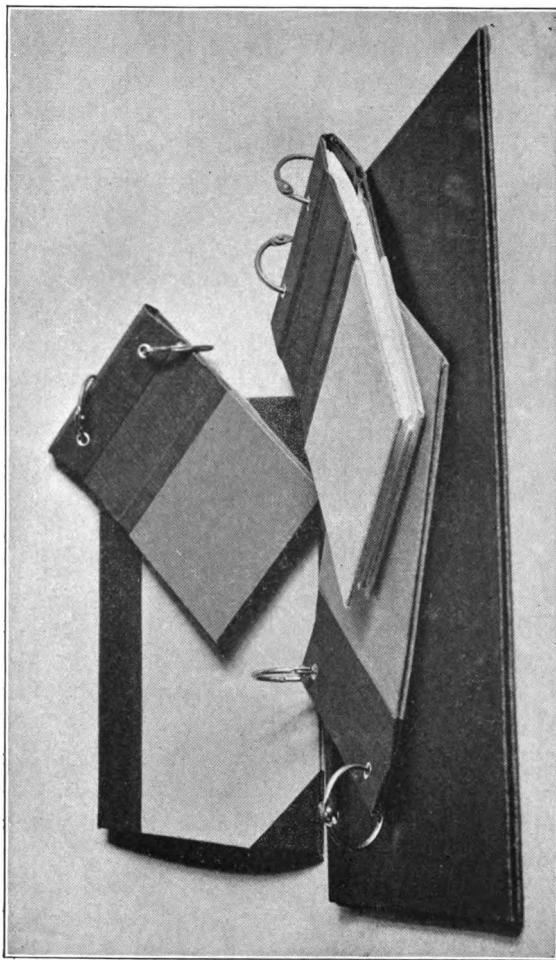
Glue, paste, 6 eyelets.

Rule, pencil, scissors, eyelet punch, knife.



INSIDE OF NOTE-BOOK COVER

BOOK PROBLEMS



NOTE-BOOK COVERS AND PORTFOLIO

PAPER AND CARDBOARD CONSTRUCTION

DIRECTIONS:

- a. Cut each piece of strawboard $\frac{3}{4}$ " from one edge.
- b. Cut two pieces of binders' cloth each 11"x 12".
- c. Locate strawboard on binders' cloth.
- d. Apply glue to strawboard and press in place on cloth.
If easier apply glue to binders' cloth.
- e. Cut corners of cloth within $\frac{1}{2}$ " of strawboard.
- f. Fold edges and glue. Wide lap on hinge should be folded after top and bottom are folded.
- g. Cut two pieces of marble paper 8"x 10 $\frac{1}{2}$ ".
- h. Paste marble paper in place.
- i. Punch holes and set eyelets as indicated in drawing.

414. Portfolio with Cloth Corners.

Cloth board, 2 pieces, 9"x 12".

Binders' cloth, 1 piece, 3"x 12".

Binders' cloth, 1 piece, 5"x 5".

Marble paper, 2 pieces, 9"x 12".

Marble paper, 1 piece, 1 $\frac{1}{2}$ "x 12".

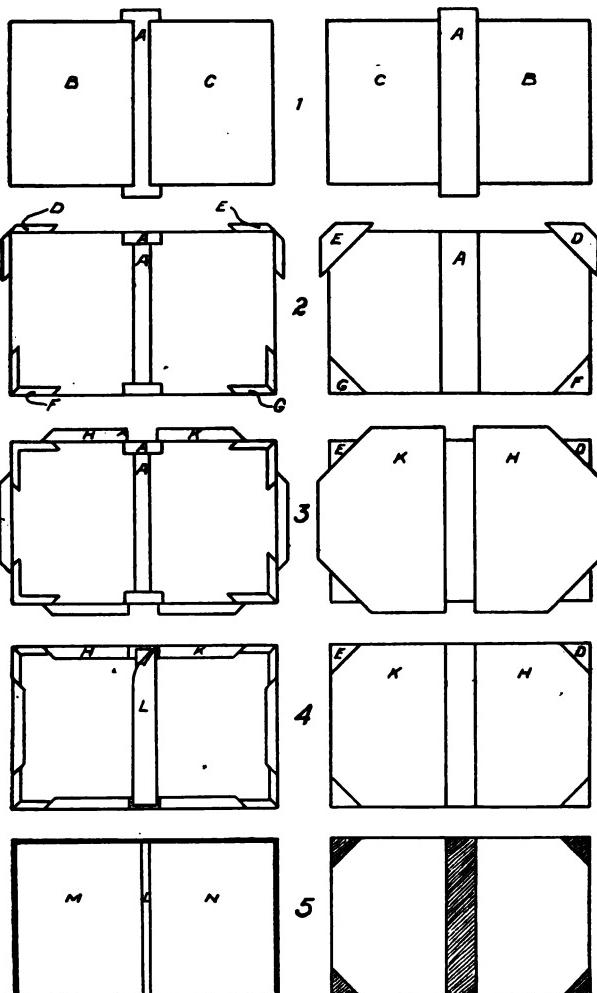
Glue and paste.

Rule, pencil, scissors.

DIRECTIONS:

- a. Cut binders' cloth 2 $\frac{1}{2}$ "x 12", from piece 3"x 12".
- b. Cut two pieces of cloth board 8"x 10 $\frac{1}{2}$ " from 9"x 12".
- c. Glue cloth board, B, C, to binders' cloth, A, as shown at step 1.
- d. Fold cloth over top and bottom and glue down flat, cut four corners of binders' cloth, D, E, F, G, each five inches along the slant line and glue in place as shown at step 2.
- e. Cut two pieces cover paper 8"x 12" with two corners of each cut away 3 $\frac{1}{2}$ "x 3 $\frac{1}{2}$ " and paste over back of portfolio,lapping over cloth back at center a fourth of an inch, as shown at H, K, in step 3.
- f. Paste laps of cover paper inside, and paste strip of marble paper 1 $\frac{1}{2}$ "x 10 $\frac{1}{2}$ " over center inside as shown at L in step 4.

BOOK PROBLEMS



INSIDE VIEW

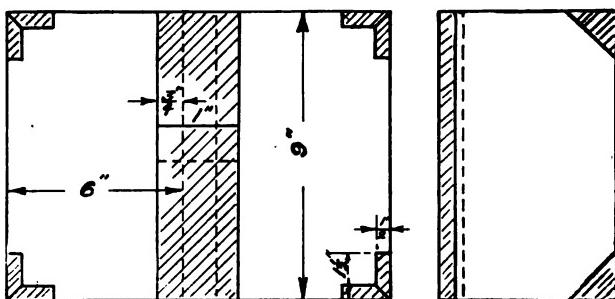
OUTSIDE VIEW

STEPS IN MAKING PORTFOLIO

PAPER AND CARDBOARD CONSTRUCTION

- g. Paste sheets of marble paper $8'' \times 10\frac{1}{4}''$ over inside of portfolio as shown at M, N, in step 5.

NOTE:—This may be used for carrying drawings or written work, and may be made in a variety of sizes. The following drawing illustrates another way of fitting the corners:



In this portfolio a heavy gray cover paper for the body and a darker gray for the corners and back make a very satisfactory combination. Light gray may be used for the lining or marble paper may be used.

The order of procedure is as follows:

- a. Cut one strip of dark gray paper $2\frac{1}{2}'' \times 19''$. One strip $2\frac{1}{2}'' \times 12''$ and one $2\frac{1}{2}'' \times 8\frac{1}{2}''$ will answer if the long strip is not available.
- b. Paste this strip around the edges of the strawboard to form the hinged back of the portfolio.
- c. Make four corners from one piece of heavy cover paper $4'' \times 4''$ or $5'' \times 5''$. For method of making these corners see number 433, or number 414.
- d. Fasten corners with paste or glue. In place of putting corners on at this stage, it is possible to put them on after step "f" and leave them unpasted over outside of cover.
- e. Cut two pieces heavy cover paper $6\frac{1}{2}'' \times 10''$ for outside of covers.

BOOK PROBLEMS

- f. Cut corners, fold edges over strawboard, and paste as in steps 3 and 4, page 59.
- g. Cut two pieces of thin gray paper each $5\frac{1}{2}'' \times 8\frac{1}{2}''$ for lining.
- h. Paste lining in place.

415. Bound Scrap-Book.

Strawboard, 2 pieces, $6'' \times 9''$.
Binders' cloth, 1 piece, $10\frac{1}{2}'' \times 14\frac{1}{2}''$.
Colored cover paper, 1 piece, $9'' \times 12''$.
Gray cover paper, 3 pieces, $9'' \times 12''$.
Canvas for backing, 1 piece, $3'' \times 8\frac{1}{2}''$.
Glue, paste.
Rule, pencil, scissors.

NOTE:—See cuts under numbers 311 and 316.

DIRECTIONS:

- a. Cut the three sheets of gray cover paper $8\frac{1}{2}'' \times 12''$.
- b. Fold these and fasten them together the same as in number 311 for the body of the book. The folds in the middle of the sheet should be only $\frac{1}{4}$ " apart and the finished pages should be $5\frac{3}{4}'' \times 8\frac{1}{2}''$.
- c. Glue strip of canvas to the back of the book, as in number 316. Place a narrow strip of paper upon the canvas to take up the glue as it comes thru.
- d. In making the cover use the same method as in 316.
- e. Set the body of the book in the cover and put in the fly leaves as in number 316.

NOTE:—The boards may be covered with paper instead of cloth and it may be made with or without corners.

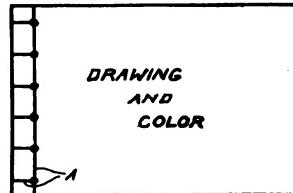
416. Bound Drawings.

Heavy cover paper, 2 pieces, size to suit the size of drawing paper used.
Crochet cotton.
Rule, pencil, scissors, needle.

PAPER AND CARDBOARD CONSTRUCTION

DIRECTIONS:

- a. Lay off points on one end of the cover for the punching of the holes. These holes should be about one inch from the end and about three-fourths of an inch apart.
- b. A neat and firm method of sewing is shown in the drawing at A.
- c. Title may be written or printed on the front cover.



NOTE:—This problem is given as one of the ways of putting into neat and permanent form the drawing plates that the children have made in their drawing lessons. These drawings should be selected and arranged according to the drawing subjects.

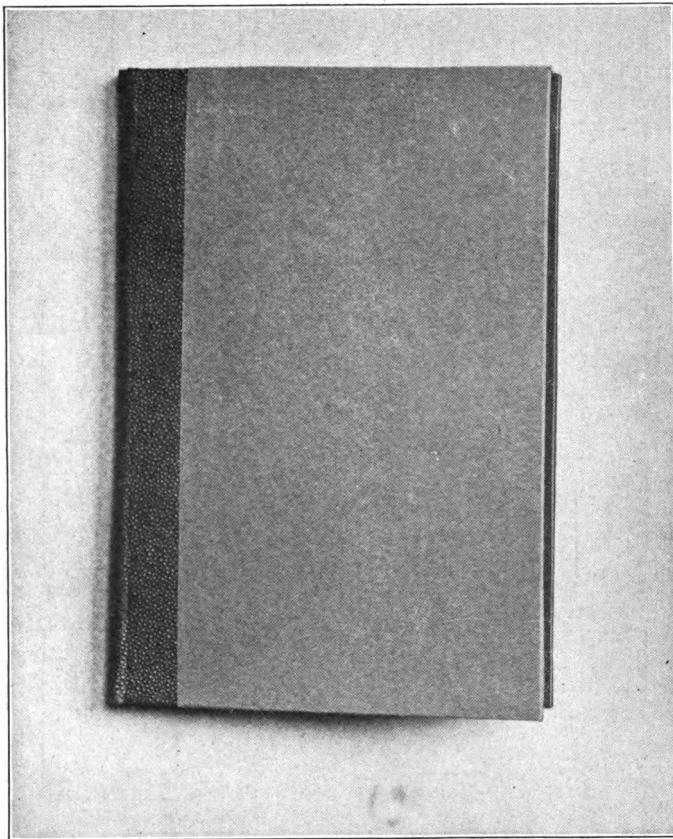
417. Rebound Book or Bound Magazines.

This work may be given in the fourth grade but is rather too difficult there. It is more suitable for fifth and sixth grades. If this work is attempted in the sixth grade the book may be taken apart in sections and re-sewed. Then it is bound as the bookbinder would bind it. For the fifth grade the following is suggested:

DIRECTIONS:

- a. Remove the cover of the magazine and apply a little paste to the back of the magazine to loosen the bits of paper and glue which remain.
- b. Glue strip of canvas on back in same manner as in number 316.
- c. Make a cover similar to that in number 316.
- d. Set book in cover and glue the canvas to the boards only.
- e. Paste in fly leaves and put in press.

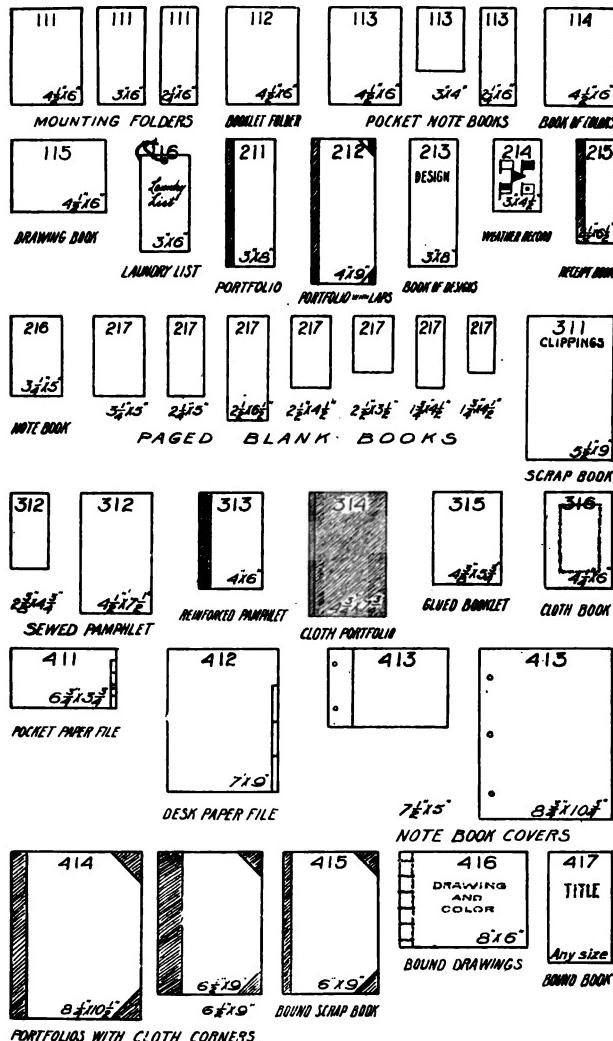
BOOK PROBLEMS



BOUNDED BOOK WITH CLOTH BACK

NOTE:—On page 64 is illustrated the arrangement of book problems as planned for the first four grades. Names, numbers and sizes are indicated for comparison and quick reference.

PAPER AND CARDBOARD CONSTRUCTION



BOX PROBLEMS.

IN the selection of problems for elementary construction in paper and cardboard, the small box takes a place second only to the booklet. Both are important industrially and both furnish good drill in the careful manipulation of tools and material. The increased use of the box as a method of handling goods for the market, and the great variety of boxes used, show the value of the field for school purposes.

Many uses of the box occur to the live teacher. The collection of materials for science, the storage of small supplies, the planting of seeds, exhibits of illustrative material of many kinds, and the meeting of temporary needs as they appear, all furnish interesting connections between the hand work processes and the uses of box problems. Special shapes and types of construction not illustrated in this chapter will be needed, but the drawings and directions may be of service in making these adaptations.

It is obvious in public school classes, especially in the lower grades, that simple hand processes where the pupil makes the entire project from beginning to end, must form the basis for a course in elementary construction.

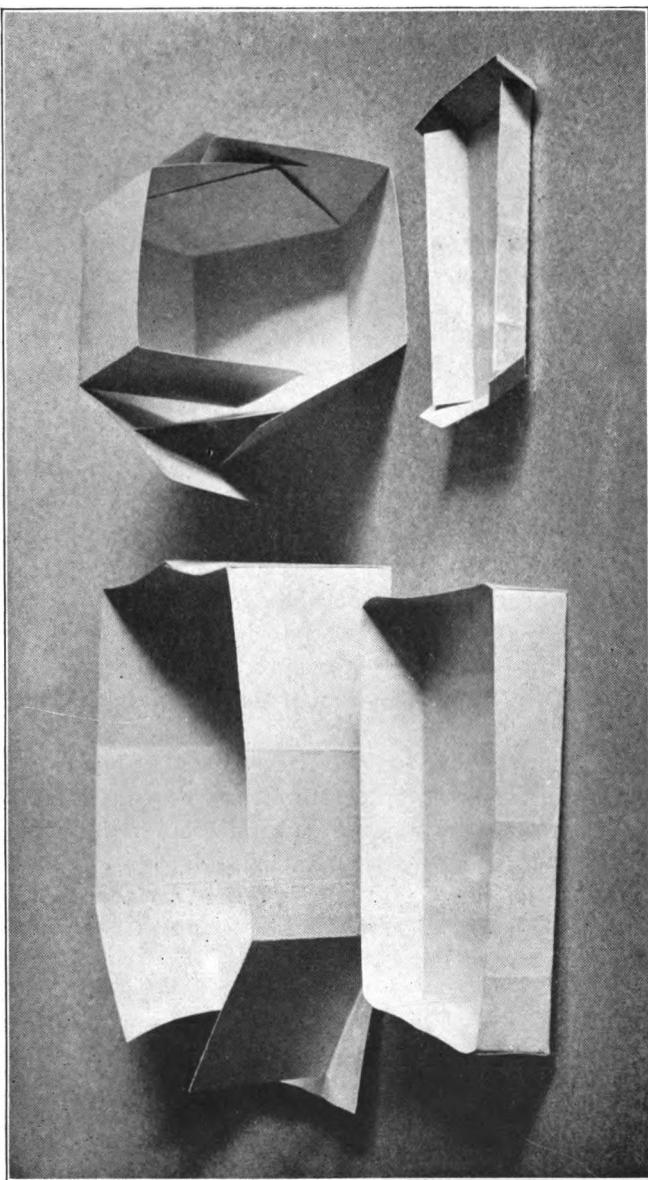
It is desirable, however, that common factory methods of box making be illustrated and described, and, if possible, a few pieces of work turned out by a modification of this duplicating process.

The arrangement of box problems by grades with kinds of material to be used, is as follows:

FIRST GRADE

- 121 Square box (Thin tag board).
- 122 Square tray (Medium tag board).
- 123 Rectangular tray (Heavy tag board).

FIRST PROBLEMS IN BOX MAKING



BOX PROBLEMS

SECOND GRADE

- 221 Small square box (Box board).
- 222 Rectangular open box (Box board).
- 223 Box with reinforced corners (Box board).

THIRD GRADE

- 321 Covered small box (Box board and plain cover paper).
- 322 Pencil box with fitted cover (Box board, plain cover paper, manila wrapping paper).
- 323 Candy box (Folding bristol).
- 324 Folding box (Folding bristol).

FOURTH GRADE

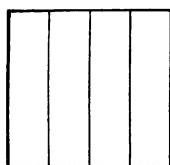
- 421 Pin box with cover (Box board and plain cover paper).
- 422 Post card box (Box board).
- 423 Original box (Thin strawboard, plain cover paper, rough cover paper).
- 424 Pen box (Strawboard, box board, plain cover paper, marble paper).
- 425 Sliding box (Box board, cover paper).

121. Square Box.

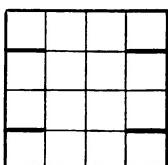
Thin tag board, 1 piece, 9"x 9".

Glue or paste.

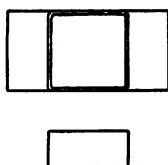
Scissors.



TAG BOARD
9"x 9"



CREASED
AND CUT



PARTLY
FOLDED



TOP



SIDE



FRONT

BOX
COMPLETE

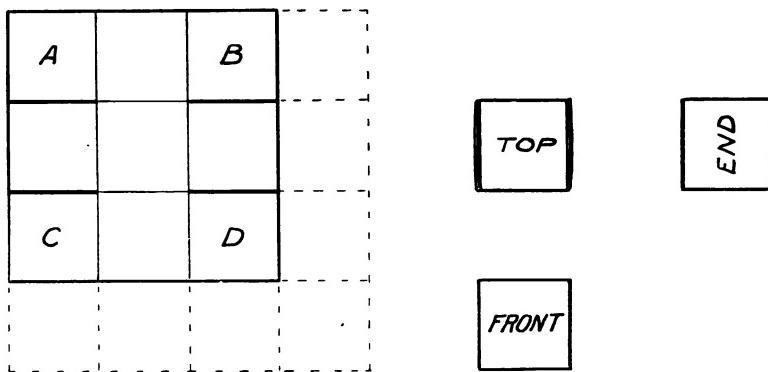
DIRECTIONS:

- a. Fold upper right corner to upper left corner, crease and open.
- b. Fold upper right corner to center of top, crease and open.

PAPER AND CARDBOARD CONSTRUCTION

- c. Fold upper left corner to center of top, crease and open.
- d. Fold lower left corner to upper left corner, crease and open.
- e. Fold lower left corner to center of left edge, crease and open.
- f. Fold upper left corner to center of left edge, crease and open.
- g. Cut as indicated by dark lines.
- h. Fold laps inside of box and paste or glue to ends.

NOTE:—As this box is too flimsy for most uses, it is well to repeat the problem with thicker tag board, if time permits. By cutting and folding as shown below, a cubical box may be made for further practice. While paste may be found easier to use, glue is much more satisfactory if properly handled. It may be found more convenient to secure stock 8"x 8" in place of 9"x 9".



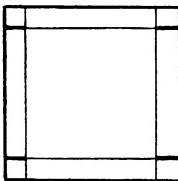
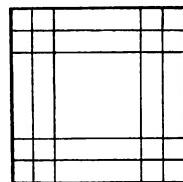
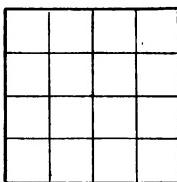
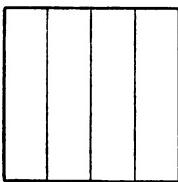
122. Square Tray.

Medium tag board, 1 piece, 6"x 6".

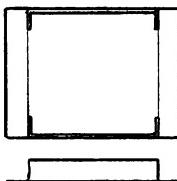
Glue or paste.

Scissors.

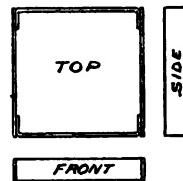
BOX PROBLEMS



SHOWING FOLDS
AND CUTS



FRONT AND
BACK FOLDED UP



TRAY COMPLETE

DIRECTIONS:

- a. Fold right to left and open.
- b. Fold right and left to center and open.
- c. Fold bottom to top and open.
- d. Fold bottom and top to center and open.
- e. Fold right edge to right crease, left edge to left crease, bottom edge to bottom crease, top edge to top crease, opening after each folding.
- f. Cut as indicated by heavy lines.
- g. Fold laps up at right angles.
- h. Fold bottom and top edges up to make front and back of tray.
- i. Fold ends up and glue or paste to laps.

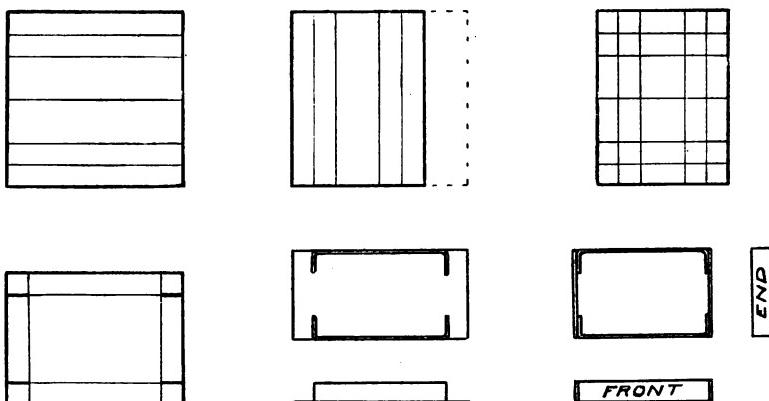
123. Rectangular Tray.

Medium tag board, 1 piece, 4"x 4".

Glue or paste.

Scissors.

PAPER AND CARDBOARD CONSTRUCTION



STEPS IN MAKING RECTANGULAR TRAY

DIRECTIONS:

- a. Fold bottom to top, bottom to center, bottom to bottom crease, and open.
- b. Fold top to center, top to top crease, and open. When opened flat it will look like the first drawing.
- c. Fold left to right edge, left to center, left to left crease, and open.
- d. Fold right to center, and cut along new crease with scissors. Dotted line in second drawing shows part removed.
- e. Fold cut edge to old center, as shown in second drawing. When opened flat this will look like the third drawing.
- f. Cut along heavy lines for laps. Shown in fourth drawing.
- g. Fold laps up, and fold front and back. Shown in fifth drawing.
- h. Fold ends up, and paste or glue to laps. Shown in last drawing.

NOTE:—A great variety of rectangular-shaped boxes or trays may be made as indicated in these three problems. As planned

BOX PROBLEMS

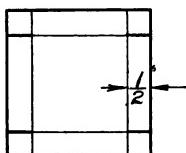
for the first grade, rule measurements are omitted in each case. More difficult constructions are reserved for later grades.

221. Small Square Box.

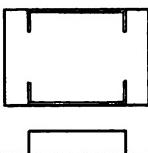
Box board, 1 piece, 3"x 3".

Glue.

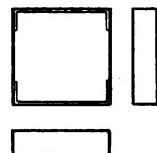
Rule, pencil, scissors.



BOX BOARD
3"x 3"



LAID OUT BOX
PARTLY FOLDED



FINISHED BOX
THREE VIEWS

DIRECTIONS:

- a. Measure from each corner of 3" square piece of box board a distance of $\frac{1}{2}$ " along each edge, and connect points, forming inner square and laps. Shown in first drawing.
- b. Fold laps up, and fold front and back. Shown in second drawing.
- c. Fold ends up, and glue to laps. Shown in last drawing.

NOTE:—As this is the first box problem involving rule measurements, care must be taken that pupils learn how to find the inch and half inch before beginning the work. The rules used should have as thin edges as possible in order to bring the markings as near the work as possible. The back of the rule should be used for a straight edge in drawing all lines. Try this problem in various sizes,—4"x 4" and 5"x 5".

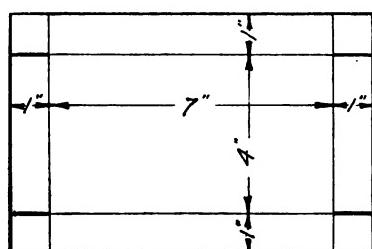
222. Rectangular Open Box.

Box board 1 piece, 6"x 9".

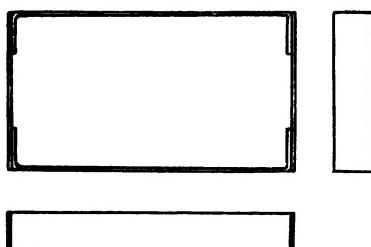
Glue.

Rule, pencil, scissors.

PAPER AND CARDBOARD CONSTRUCTION



BOX BOARD LAID OUT



BOX COMPLETE

DIRECTIONS:

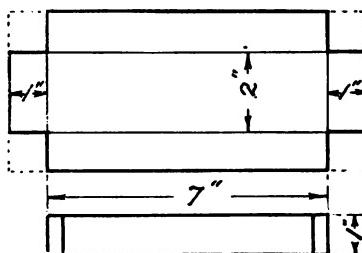
- a. Lay out horizontal measurements from drawing, which may be placed upon the black board. Make short marks at top and bottom and connect.
- b. Lay out vertical measurements at right and left edges and connect.
- c. Cut along heavy lines for laps.
- d. Fold laps up at right angles and fold sides up at right angles.
- e. Fold ends up and glue to laps.

223. Box with Reinforced Corners.

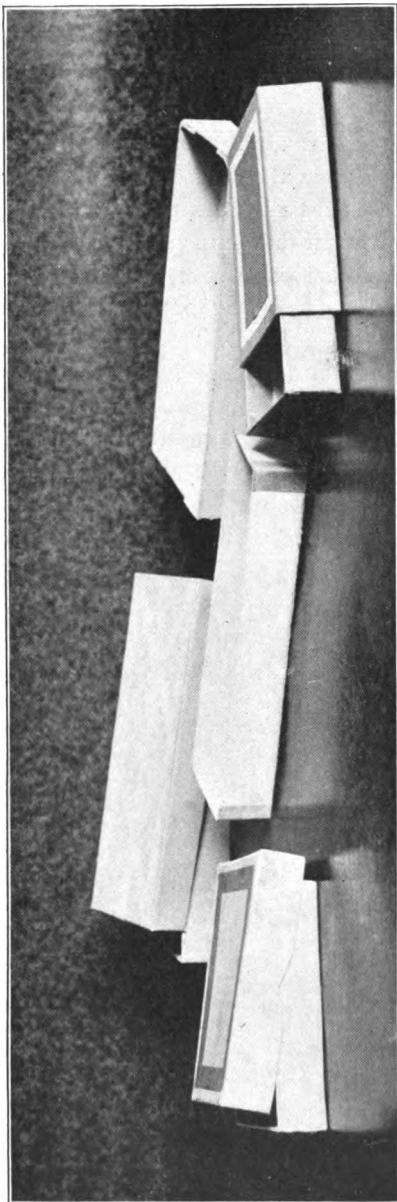
Box board, 1 piece, 6"x9".

Grooved stay tape, 1 piece, 4" long.

Rule, pencil, scissors.



STOCK CUT TO SIZE 4"x9" AND FINISHED BOX



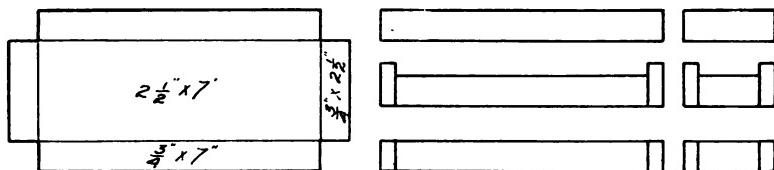
OPEN, COVERED AND SLIDING BOXES

PAPER AND CARDBOARD CONSTRUCTION

DIRECTIONS:

- a. Cut box board 4"x9".
- b. Lay out lines on all sides, 1" from edge.
- c. Cut away corners as indicated in drawing.
- d. Use the straight edge of rule and the dull points of scissors and score on the lines for folding. This will allow the board to be bent without cracking irregularly.
- e. Fold up sides and ends. Do not fold much beyond a position which is at right angles with the bottom.
- f. Cut four pieces of the stay tape each slightly less than 1" in length.
- g. Moisten tape and put in place on outside of corners. Hold sides of box and tape in proper position until the tape sticks.

NOTE:—The following drawing may be used in place of the one on page 72 or the wider box may be made as an extra problem.



• STEPS IN MAKING BOX WITH REINFORCED CORNERS

321. Covered Small Box.

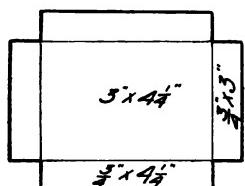
Box board, 1 piece, 6"x9".

Plain cover paper, 1 piece, 6"x9".

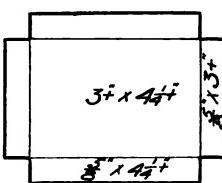
Stay tape, 8", paste.

Rule, pencil, scissors.

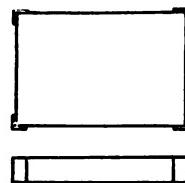
BOX PROBLEMS



BOX CUT OUT
 $4\frac{1}{2}'' \times 5\frac{3}{4}''$



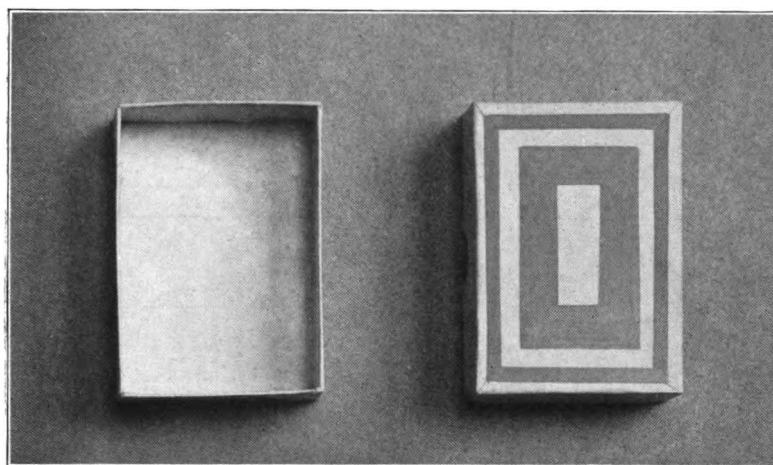
COVER OF BOX
 $4\frac{1}{4}'' \times 5\frac{1}{2}''$



FINISHED BOX
AND COVER

DIRECTIONS:

- a. Lay out and cut box and cover to measurements.
- b. Cut plain colored cover paper from same measurements, but with a little extra paper all around. This should not be over $\frac{1}{16}''$ on all sides.



BOX AND COVER

- c. Fold box and fasten corners with stay tape, cutting tape even with top and bottom edges.
- d. Paste colored paper over box.

PAPER AND CARDBOARD CONSTRUCTION

- e. Fold cover and try on box to see if size is correct. Cover must be large enough to slide easily but closely over box.
- f. Fasten corners of cover same as box with stay tape.
- g. Paste colored paper over cover.

NOTE:—It may seem desirable in this first problem of fitting a box to omit the use of the colored paper, or to make two boxes, one with the paper finish and one without.

322. Pencil Box with Fitted Cover.

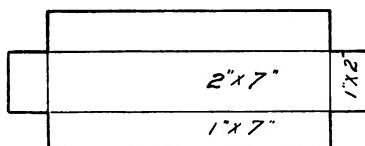
Box board, 2 pieces, 6"x 9".

Plain cover paper, 2 pieces, 6"x 9".

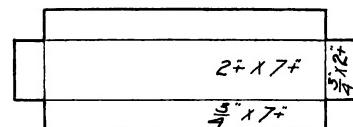
Manila wrapping paper, 1 piece, at least 1"x 16", or 2"x 8".

Glue, paste.

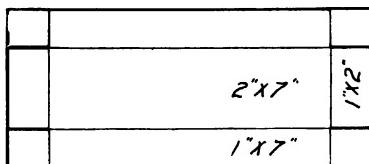
Rule, pencil, scissors.



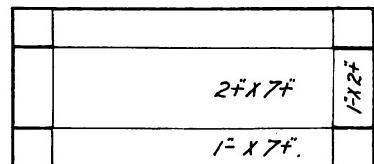
BOX CUT TO SIZE, 4"x 9"



COVER OF BOX, 3½+"x 8½+"



PAPER OUTSIDE FOR BOX, 4"x 9"



PAPER OUTSIDE FOR COVER, 4"x 9"

BOX PROBLEMS

DIRECTIONS:

- a. Lay out and cut box and cover, and paper outside for each, leaving laps on outside pieces as indicated.
- b. Fold box and fasten corners with 1" square pieces of manila paper glued around joint.
- c. Paste colored paper over box with lap around the corner and end pasted over lap.
- d. Fold cover and try on box to see if size is correct.
- e. Fasten corners of cover same as box with manila paper $\frac{3}{4}'' \times 1''$.
- f. Paste colored paper over cover, using extra width to fold inside.

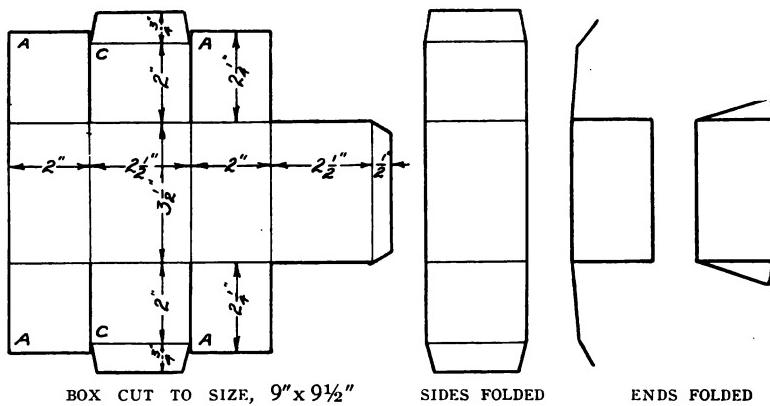
NOTE:—Two extra pieces of plain cover paper of a different shade of color from that used on the outside, may be used for lining the box and cover.

323. Candy Box.

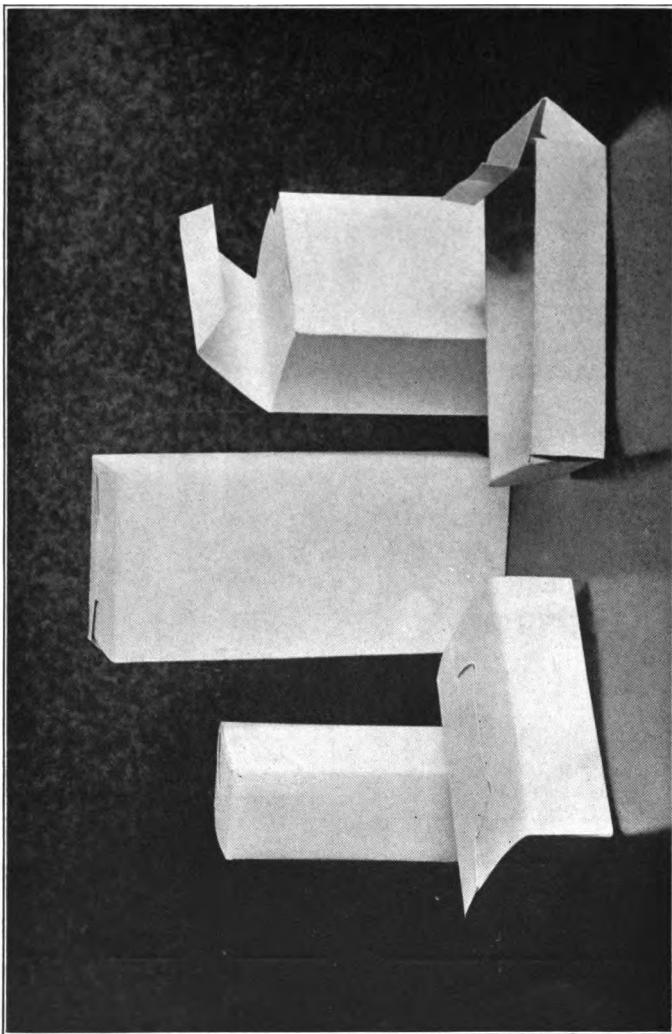
Folding Bristol, 1 piece, 9" x 12".

Glue.

Rule, pencil, scissors.



PAPER AND CARDBOARD CONSTRUCTION



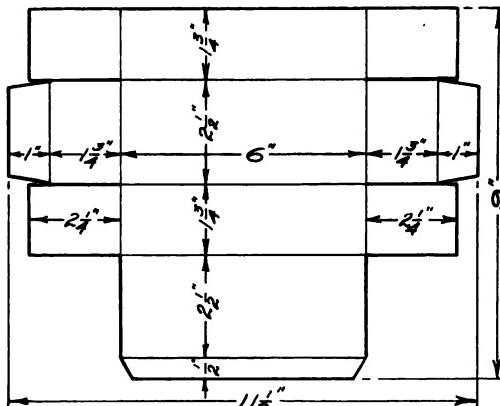
TYPES OF FOLDING BOXES

BOX PROBLEMS

DIRECTIONS:

- a. Lay out and cut along heavy lines.
- b. Fold up along light lines and open flat.
- c. Refold along vertical lines and glue long lap inside.
- d. Leave under pressure until next day.
- e. Next day, fold ends in place.

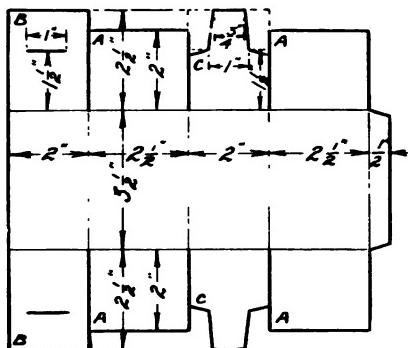
NOTE:—Varied sizes of this same box may be made from the 9"x 12" stock, and heavy tag board may be used in place of bristol board. Pupils may be directed to determine their own proportions for a box, or they may make the following:



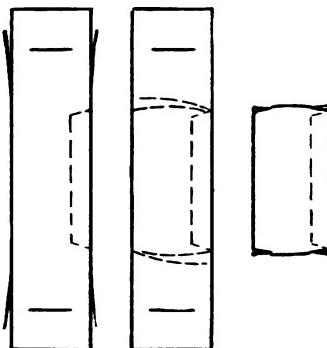
LARGE BOX MADE FROM 9" x 12" STOCK

In place of either of these boxes, or as an extra problem, the box illustrated on the next page may be made. Taking this as a type, other schemes for fastening may be devised by the pupil. It may seem desirable to give a large piece of stock and remove the size limitations necessary for the 9"x 12". Any of the boxes shown may be given a handle of narrow cotton tape cut thru one side and glued within.

PAPER AND CARDBOARD CONSTRUCTION

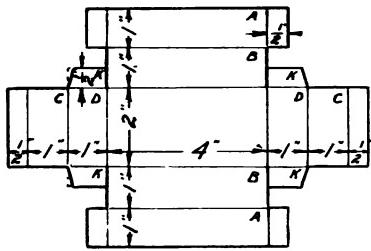


ANOTHER WAY OF MAKING THE CANDY BOX

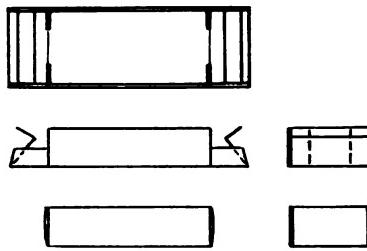


324. Folding Box.

Folding bristol, 1 piece, 9"x 12".
Rule, pencil, scissors.



BOX CUT OUT 6"x9"



METHOD OF FOLDING

DIRECTIONS:

- a. Lay out from drawing and cut along heavy lines.
 - b. Fold sides AA over BB, and fold side lap up at right angles.
 - c. Fold sides BB up at right angles to bottom of box.
Side laps will be seen standing up at right angles to bottom also.
 - d. Open box flat.

BOX PROBLEMS

- e. Fold ends CC over DD, and fold end laps up at right angles.
- f. Fold four inner corner laps KK up at right angles.
- g. Fold ends DD up at right angles to bottom of box and unfold flat.
- h. Refold sides at right angles to bottom.
- i. Refold ends at right angles to bottom. The three upper views at right of drawing show the sides up and the ends ready to fold.
- j. Fit the laps KKKK between folds of the sides and let ends CC fold over side laps to make box rigid. The two bottom views at the right of drawing show the finished box.

NOTE:—This type of box has the advantage that it can be instantly opened flat, and as quickly refolded, and held without the use of glue. It is possible to make a cover for this by changing the measurements slightly and repeating the process. Tag board may be used in place of folding bristol for this box. Exact work is necessary in laying out, in cutting, and in folding.

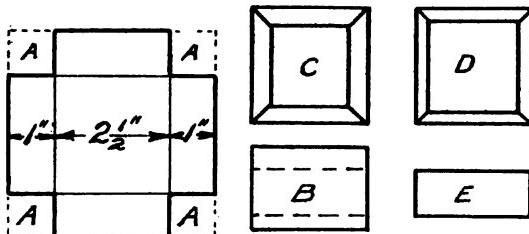
421. Pin Box with Cover.

Box board, 1 piece, 6"x 9".

Cover paper, 1 piece, 9"x 12".

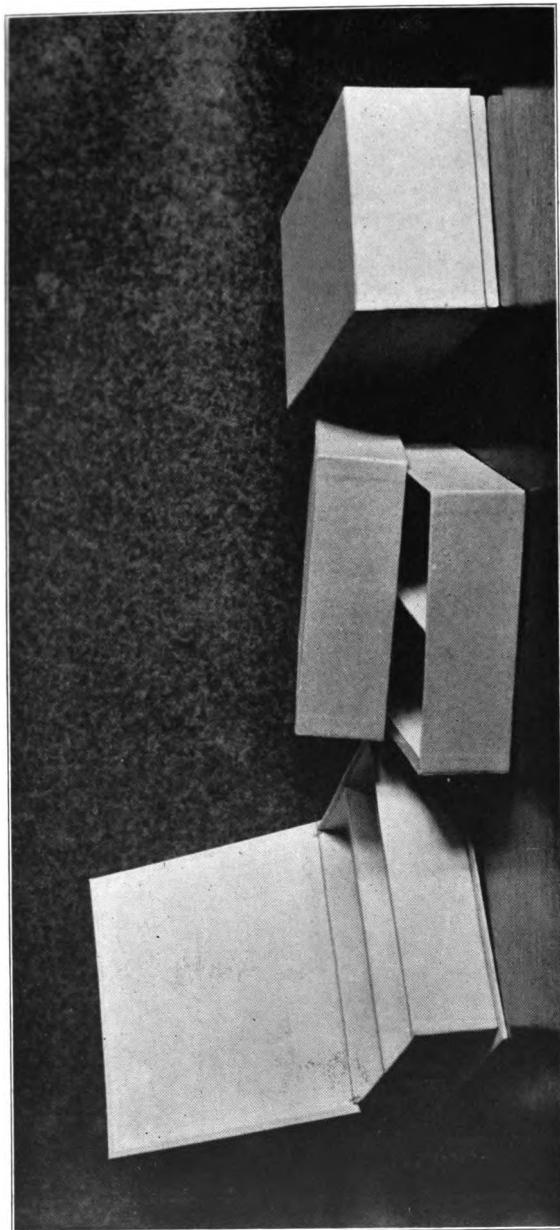
Stay tape, 1 piece, 8" long.

Rule, pencil, scissors.



BOX CUT OUT, TOP AND SIDE OF COVER

BOXES WITH PARTITIONS



BOX PROBLEMS

DIRECTIONS:

- a. Cut one piece of box board $4\frac{1}{2}'' \times 4\frac{1}{2}''$ for bottom.
- b. Cut another piece of box board $4\frac{5}{8}'' \times 4\frac{5}{8}''$ for the cover.
- c. Cut two pieces of cover paper each $2\frac{1}{2}'' \times 11''$ for finishing sides.
- d. Cut one piece of cover paper, $2'' \times 2''$ for finishing top.
- e. Lay out lines on both pieces of box board $1''$ from all edges.
- f. Cut away corners AAAA on box and cover.
- g. Score on lines with back of scissors and fold sides up at right angles.
- h. Cut 8 pieces of stay tape, each $\frac{7}{8}''$ long.
- i. Moisten stay tape and stick on outside of corners.
- j. Apply paste to the sides of the cover of the box and press the strip of cover paper in place, B, so that both edges may be folded,—one over the edge of the box board to the inside of the box, and the other pasted down on the top of the box, C. Do not cut corners when folding here.
- k. Apply paste to the piece of cover paper $2'' \times 2''$, and press in place on top of box, D. The side of the cover is shown at E.
- l. The processes given under "j" are repeated for the bottom of the box.

NOTE:—If desired, the cover paper $2'' \times 2''$ for the top may be of a different color than the paper for the sides. The border which is indicated as $\frac{1}{4}''$ on each side may be wider or narrower as the pupil may choose.

422. Post Card Box.

Box board, 1 piece, $9'' \times 12''$.

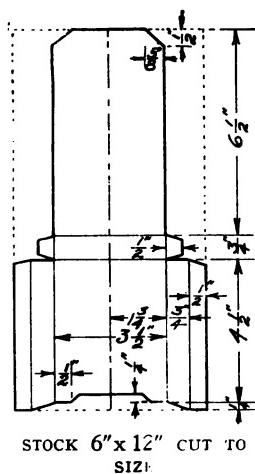
Glue.

Rule, pencil, scissors.

PAPER AND CARDBOARD CONSTRUCTION

DIRECTIONS:

- a. Locate and draw center line lengthwise of board.
- b. Measure each side of the center line distances as indicated in the drawing.
- c. Measure up from the bottom as indicated in the drawing to locate the horizontal lines.
- d. When all vertical and horizontal lines are drawn proceed to lay out for the angular cuts.
- e. Make pencil marks heavy to show where to cut away.
- f. Cut on heavy lines.
- g. Fold on light lines, considering the form and how it is to be glued together.
- h. Glue with all tabs on the inside.



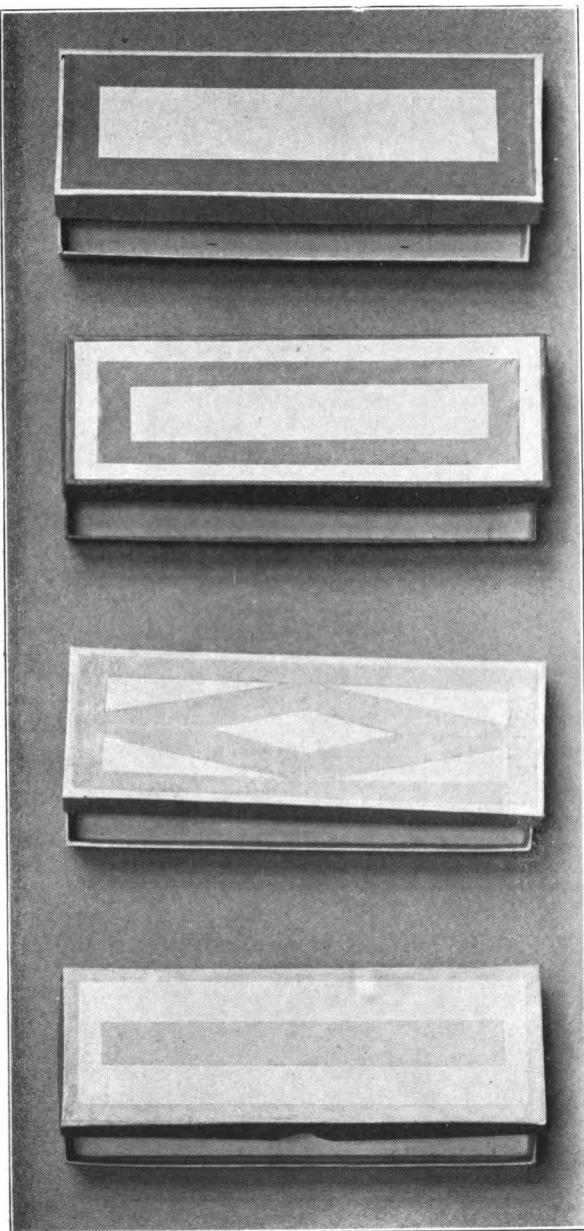
423. Original Box.

Thin strawboard, 2 pieces, 9"x 12".
Plain cover paper, 2 pieces, 9"x 12".
Rough cover paper, 2 pieces, 9"x 12".
Binding tape, glue, paste.
Rule, pencil, scissors (chip carving knife if desired).

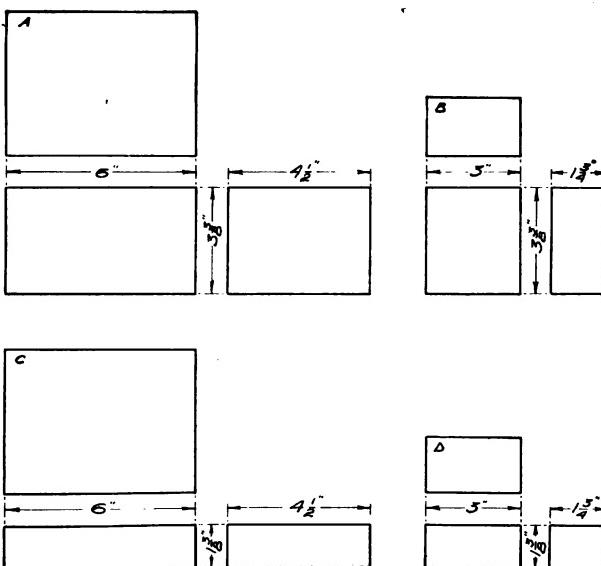
DIRECTIONS:

- a. Follow directions from number 421, except that the strawboard should be scored on both sides with the back of the scissors before folding.
- b. Cover both box and cover outside with rough cover paper.
- c. Line both box and cover with plain cover paper.

COVERED BOXES



PAPER AND CARDBOARD CONSTRUCTION



FOUR SUGGESTED SHAPES FOR BOXES,—A, B, C, D

NOTE:—An unlimited opportunity is offered here for the pupil to work out original shapes of boxes for varied uses. The four drawings are given only as a suggestion for possible shapes which can be made from the stock supplied. An attempt is made in each case to get an interesting variation in the proportion of side, top and end. If enough time can be given to this phase of the work, it may be well to have each pupil make several boxes of the same type, gradually developing the ability to do a first class piece of special work.

424. Pen Box.

Strawboard, 1 piece 4"x 4 $\frac{1}{2}$ " (or 6"x 4 $\frac{1}{2}$ ").

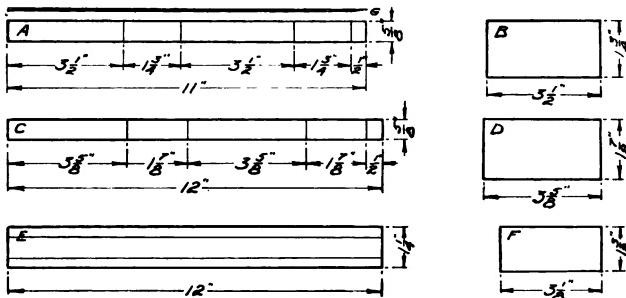
Box board (or pulp board), 1 piece 2"x 12". If more convenient use all box board or all strawboard.

Plain cover paper (or marble paper or plated paper), 1 piece 4 $\frac{1}{2}$ "x 12".

BOX PROBLEMS

Plain cover paper, different color, 1 piece 3"x 6".
Glue, paste.

Rule, pencil; scissors, knife, cutting board.



STOCK CUT TO SIZE FOR PEN BOX

DIRECTIONS:

- a. Cut box board A, for sides of box, $\frac{5}{8}$ "x 11", and crease as indicated for folds.
- b. Make end G a little thinner by scraping or cutting with scissors or knife.
- c. Cut strawboard B, for bottom of box. If heavy material be used, it may be given cut to size with a card cutter, or pupils may cut it with a knife and straight edge upon a piece of cloth board.
- d. Cut box board C, for sides of cover, $\frac{5}{8}$ "x 12", and crease for folds.
- e. Cut strawboard D, for base of cover.
- f. Cut two pieces of plain cover paper E, $1\frac{1}{4}$ "x 12", for finishing outside of box and cover.
- g. Cut plain cover paper F, for finishing top of cover of box.
- h. Fold A and glue around B with lap G inside, and paste cover paper E around sides and bottom of box and down inside. Long creases of E are shown in drawing.
- i. Fold C and D in same manner and cover sides.
- j. Paste cover paper F over center of top of cover.

PAPER AND CARDBOARD CONSTRUCTION

NOTE:—This type of construction is very common for small boxes, but requires careful fitting. It makes a first class problem for repeated work, and may be made in place of number 423. A second box of this type is made by pupils very much better than the first.

425. Sliding Box.

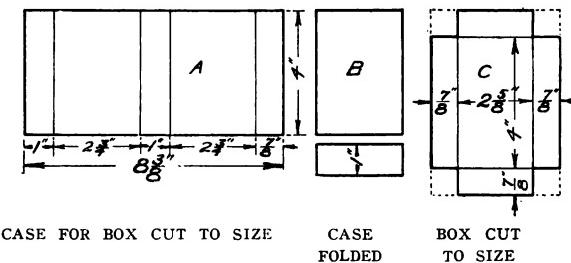
Box board, 1 piece, 9"x 12".

Cover paper, 1 piece, 9"x 12".

Stay tape, 1 piece, 4" long.

Paste, glue.

Rule, pencil, scissors.



DIRECTIONS:

- a. Cut one piece of box board 4"x 8 3/8" for case A.
- b. Cut one piece of box board 4 3/8"x 5 3/4" for box C.
- c. Lay out the measurements for case as indicated on drawing A.
- d. Fold to shape as indicated at B.
- e. Spread glue on the inside of the $\frac{1}{2}$ " fold and glue case together. When glue begins to stick the case may be pressed flat and weighted.
- f. Lay out lines $\frac{1}{2}$ " from all edges on box board for box C.
- g. Cut away corners.
- h. Fold up sides and ends.

BOX PROBLEMS

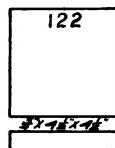
- i. Cut four pieces of stay tape each $\frac{3}{4}$ " long. Manila paper may be used here if desired as in number 322.
- j. Fasten corners in place with the stay tape or with manila paper.
- k. Cut one piece of the cover paper 5"x 9" to cover the case.
- l. Cut strips of cover paper 2" wide and long enough to reach around the sides of the box. This length may be determined by each pupil separately.
- m. Paste these strips of paper around the sides of the box in the same manner as in number 421.
- n. Paste cover paper around case and fold edges in at ends. These ends must be folded in carefully and pressed smooth or the box will catch and tear them up when sliding thru.

NOTE:—By using tough paper instead of the stay tape a closer fit may be made and a smoother slide will result.

The boxes which have been explained are perhaps sufficiently varied in construction to suggest any type of box which may be desired for primary handwork. Boxes with tied covers have been purposely omitted as being less satisfactory as finished articles. This is in line with the stated purposes of the book to emphasize the simpler and more typical and practical problems for school use.

On the next page is illustrated the entire arrangement of box problems, with names, numbers and recommended sizes.

PAPER AND CARDBOARD CONSTRUCTION

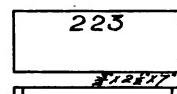
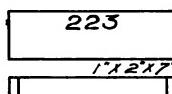
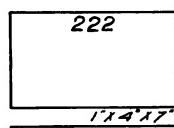


RECTANGULAR TRAY

SMALL SQUARE

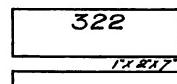
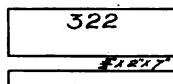
SQUARE TRAY

SQUARE BOX AND CUBE



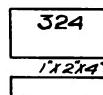
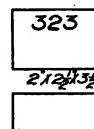
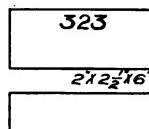
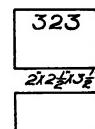
BOXES WITH REINFORCED CORNERS

RECTANGULAR OPEN BOX



PENCIL BOXES WITH FITTED COVERS

COVERED SMALL BOX



FOLDING BOX

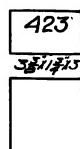
SMALL AND LARGER CANDY BOXES



PIN BOX
WITH COVER



POST CARD BOX



ORIGINAL BOX



PEN BOX



SLIDING BOX

BOX PROBLEMS ARRANGED BY GRADES

IV

CARD PROBLEMS.

CARD mounts furnish a good field for a study of proportion in simple and effective arrangements of rectangular shapes, and they give a good place for the study of color relations. In the study of pictures an interest is added in the making of suitable mounts. In some cases pictures suitable for framing may be mounted by the children. This mounting work may be handled as a subject by itself, and pictures supplied as needed, or in connection with the work in drawing and art study. In many cases the drawings of the children are good subjects for mounting.

A frequent demand for proper mounts for illustrative matter such as grasses and samples of papers and fabrics is met by having mounts of heavy material made as needed. Magazine illustrations related to school subjects furnish endless features proper for mounting in the handwork class. Mounts of uniform size for filing enable the teacher or pupil to have available at all times supplementary illustrations of interesting details of school work. The blue-prints and charts mentioned in the note number 433 are especially valuable both as exercises and finished products. While the cutting and placing of pictures and illustrative material do not require much calculation or difficult manipulation, they do require care and accurate judgment and neat workmanship and so have a place in a primary handwork course.

Besides the making of mounts, whether of heavy cover paper or mounting boards, there are many other problems which may be grouped as card problems, to be made of tag board and heavy cover papers. These are arranged in places in the school where they can be handled successfully, and it will be seen that they give a good drill upon careful measuring and cutting to the line. The list may be extended indefinitely, especially if compasses be available. The extensive use of the compass is

PAPER AND CARDBOARD CONSTRUCTION

not advised where the pupils are required to make their own designs as they can seldom produce good outlines based upon compass curves.

The arrangement of card problems and materials by grades is as follows:

FIRST GRADE

- 131 Mounted drawings (Heavy cover paper, gray drawing paper).
- 132 Book marks (Medium tag board).
- 133 Calendar (Heavy cover paper or mounting board).

SECOND GRADE

- 231 Desk blotters (Blotting paper and heavy cover paper).
- 232 Photo mount (Heavy cover paper).
- 233 Glass cover (Heavy tag board).

THIRD GRADE

- 331 Post card (Medium or heavy tag board).
- 332 Page holder (Heavy cover paper).
- 333 Shipping tags (Heavy tag board).

FOURTH GRADE

- 431 Postal scale (Marble board and bristol board).
- 432 Folder picture mount (Heavy cover paper or mounting board).
- 433 Desk pad (Strawboard, heavy cover paper, thin cover paper).

131. Mounted Drawings.

Heavy cover paper, 1 piece, 9"x 12".

Gray drawing paper, 1 piece, 9"x 12".

Paste.

Rule, pencil, crayon, scissors.

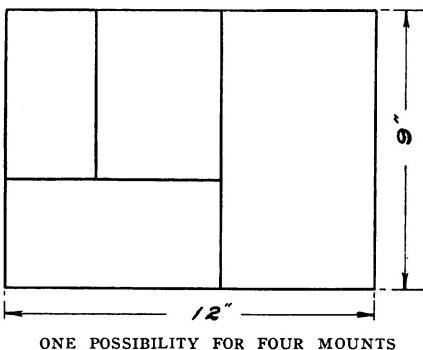
DIRECTIONS:

- a. Cut two or more mounts from the 9"x 12" sheet of heavy cover or mounting paper. In the cut is shown how four mounts of different sizes and shapes may be cut from the large sheet.
- b. Cut as many pieces of drawing paper as there are mounts. Each piece of drawing paper should be of such size

CARD PROBLEMS

and shape as will look well when mounted.

- c. Make drawings on the pieces of drawing paper.
- d. Mount drawings by fastening the two upper corners with a little paste.



NOTE:—The teacher may determine the number, size, and shape of the mounts. The pupils have a chance to study, under the teacher's direction, the size and proportion of the pieces of drawing paper when these are being cut to size. Color is important here. To simplify matters for public school work the mounting paper may be of a medium or dark gray and the drawing paper of a lighter gray. The same idea works out well in tones of brown.

The directions given above may be reversed and, after drawings are made and drawing paper cut, the mounts may be made of suitable size and proportion to fit the drawings.

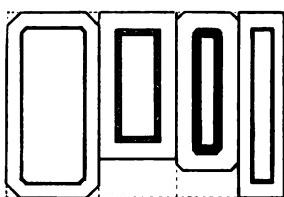
132. Book-Marks.

Medium tag board, 1 piece, 6"x 9".
Rule, pencil, scissors.

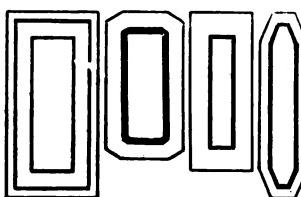
DIRECTIONS:

- a. The teacher should determine beforehand several rectangular shapes which can be cut from the 6"x 9"

PAPER AND CARDBOARD CONSTRUCTION



FOUR BOOK-MARKS FROM
6"x 9" STOCK



SAME PIECES WITH
OTHER BORDERS

piece. Four pieces of different sizes and shapes are shown in the drawings.

- b. Have the pupils lay off on the piece of tag board, shapes as nearly as possible like those shown by the teacher. This laying out is done without measuring. The teacher should indicate the method of procedure by making a drawing on the blackboard.
- c. After all the pieces are cut to the desired rectangular shapes, lines are drawn across the corners with the rule to indicate the parts to be cut away.
- d. Some simple line or band decorations may be put on with pencil or crayon.

NOTE:—In place of following the teacher's arrangement of shapes from a blackboard drawing, pupils may be encouraged to make their own designs and border decoration. In some cases other forms of decoration may be attempted, if the teacher be competent to set adequate limitations.

133. Calendar.

Heavy cover paper, or heavy mounting paper, 1 piece, 6"x 9".

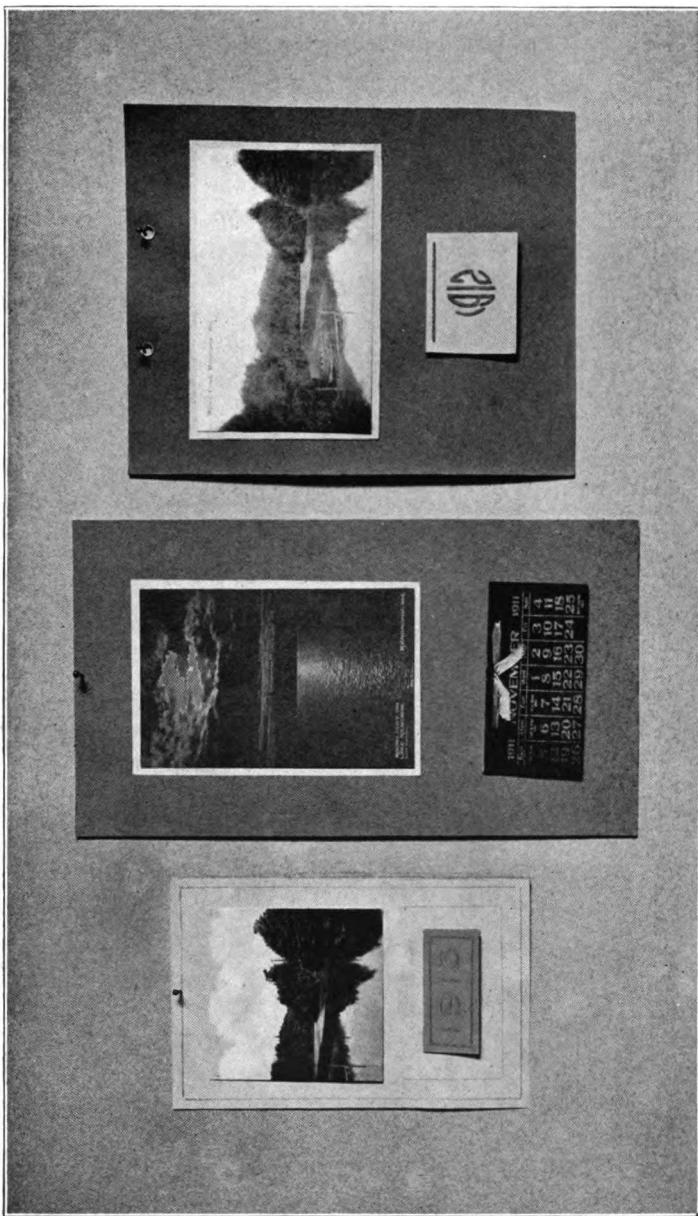
Calendar about 1 $\frac{1}{4}$ "x 2".

Picture,—half-tone or photograph.

Paste.

Rule, pencil, scissors.

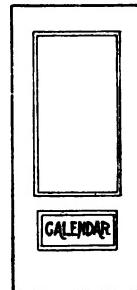
CALENDARS MOUNTED WITH PHOTOGRAPHS



PAPER AND CARDBOARD CONSTRUCTION

DIRECTIONS:

- a. Cut mount to size and shape which is determined by the size and shape of the picture combined with the size and shape of the calendar pad.
- b. Consider the spaces left at the sides and top and bottom, consider also the proportion of these spaces with the spaces occupied by the picture and pad.
- c. When picture and pad are satisfactorily located make light pencil marks at the corners in order to know just where they are to be replaced in pasting.
- d. Paste picture in place.
- e. Paste calendar in place.

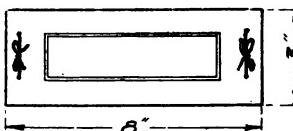


TYPICAL
ARRANGEMENT
OF MOUNT

NOTE:—A piece of mounting board may seem more suitable, especially if one wishes to stand the calendar upon a shelf.

231. Desk Blotters.

Blotting paper, 1 piece, 9"x 12".
Heavy cover paper, 1 piece, 6"x 9".
Long narrow pictures, 2, about $1\frac{1}{2}'' \times 5\frac{1}{2}''$.
Paste, colored cord (or narrow ribbon).
Rule, pencil, scissors, punch.

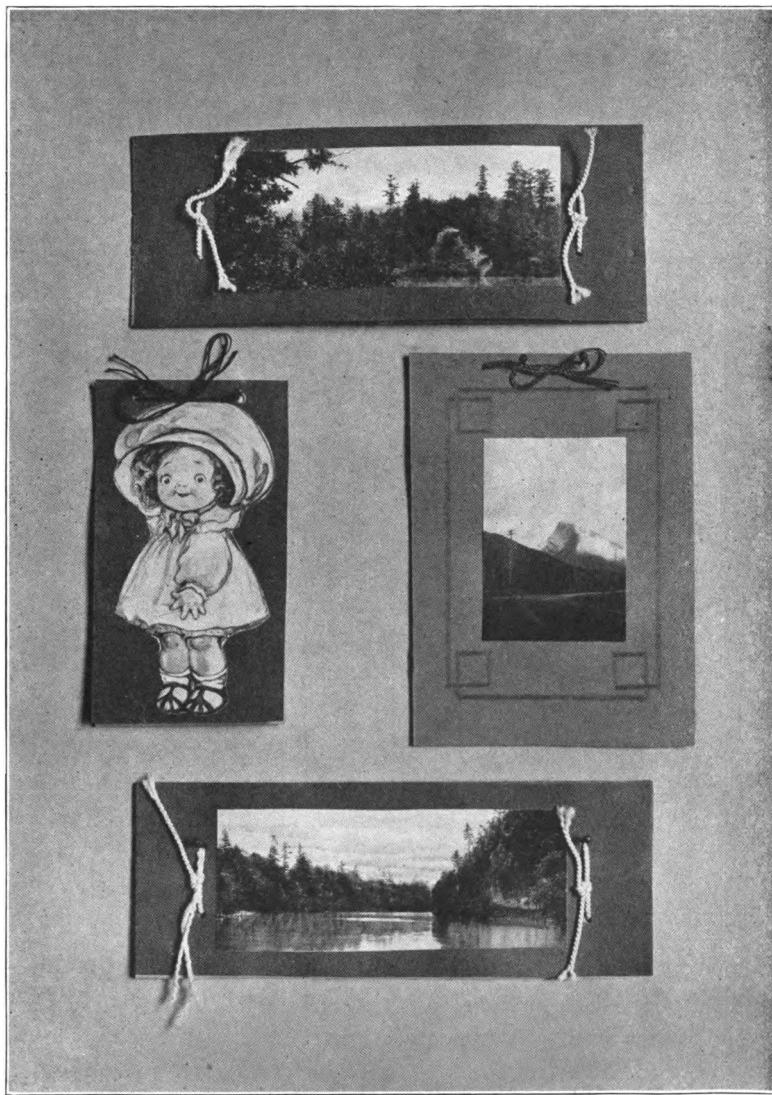


BLOTTERS TIED UNDER COVER

DIRECTIONS:

- a. Cut four pieces of blotting paper each 3"x 8".
- b. Cut two pieces of heavy cover paper each 3"x 8".

CARD PROBLEMS



DESK BLOTTERS

PAPER AND CARDBOARD CONSTRUCTION

- c. Punch holes at each end and tie one piece of cover paper over two pieces of blotting paper with colored cord or narrow ribbon; make two models.
- d. Trim pictures to desired size and paste in place.

NOTE:—One of these may be used by the pupil, and the other used as a gift, or saved for exhibit purposes.

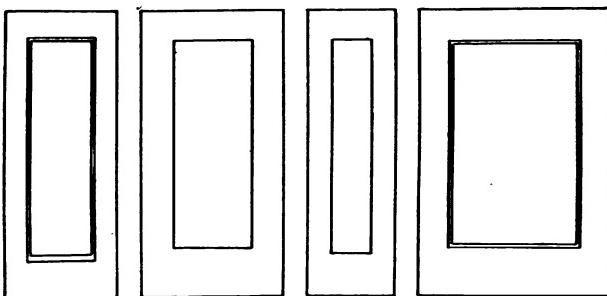
232. Photo Mount.

Heavy cover paper, 1 piece, 6"x 9".

Unmounted photograph or small colored poster or a colored magazine illustration. A black and white half-tone or line drawing will do if nothing else be available.

Paste.

Scissors.



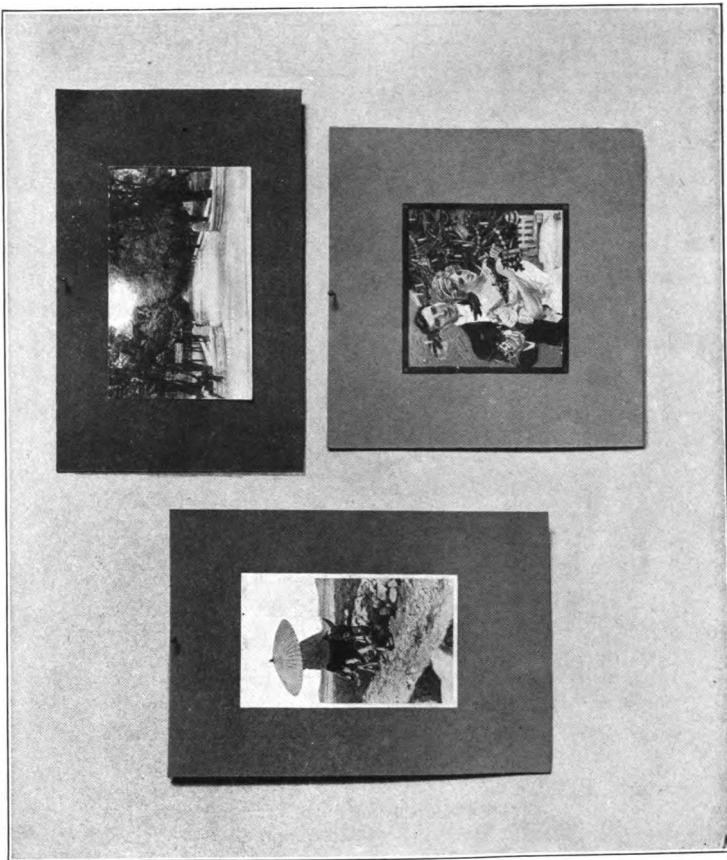
SUGGESTIONS FOR PROPORTION IN MOUNTING PANEL PICTURES

DIRECTIONS:

- a. Cut out picture.
- b. Select suitable color in mounting paper. Dark colors can best be used with photographs and with colored pictures. White and lighter colors are suitable for line drawings and halftones. Gray is more likely to be used successfully than any other color. Black may be used in place of dark colors.

CARD PROBLEMS

PICTURE MOUNTS



PAPER AND CARDBOARD CONSTRUCTION

- c. Cut mount in good proportion and paste. Get variation in sizes, and have bottom margin larger than side margin. Avoid overcrowding and too striking contrasts.



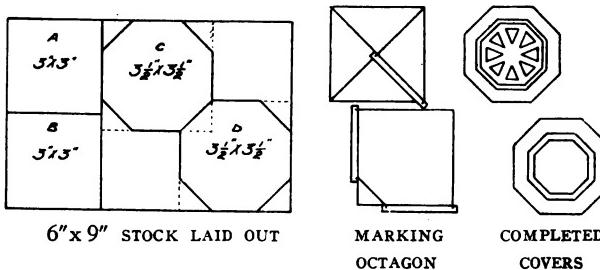
OTHER SUGGESTIONS FOR MOUNTING

NOTE:—In case there are any especially good pictures, they may be mounted first upon paper with a narrow margin and then mounted upon the larger mount as illustrated in the left and right drawings.

233. Glass Cover.

Heavy tag board, 1 piece, 6"x9".

Rule, pencil, scissors (also compass if available).



DIRECTIONS:

- Lay out from drawing. Make A and B 3" square, make C $3\frac{1}{2}$ " square, next to A and at the top of card, make D $3\frac{1}{2}$ " square, from lower right corner of card.
- Cut out A, B, C, and D. A and B are to be cut into regular octagons later, C and D will remain only approximately regular.

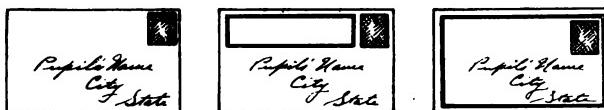
CARD PROBLEMS

- c. Lay out square A as a regular octagon from second drawings. Draw diagonals and measure distance from corner to center with strip of paper or tag board, lay this out from each corner along adjacent sides as shown for one corner in the drawing, connect the points as indicated, cut off corners.
- d. Decoration by means of border lines or simple center pattern may be added.

NOTE:—A convenient use for this model is to cover a glass of liquid, which for any reason, as for sickness, must remain for a time unused. If compasses be available, the octagon may be laid out more easily by swinging the distances from the corner with them. In place of an octagonal cover, a circular one may be made with a radius of $1\frac{1}{2}$ " or $1\frac{3}{4}$ ". The decorations may be made with a brush and water color or with pen and ink or with pencil.

331. Post Card.

Medium or heavy tag board, 1 piece, 6"x 9".
Rule, pencil, scissors.



THREE STYLES OF POST CARD $3\frac{1}{4}" \times 5\frac{1}{2}"$

DIRECTIONS:

- a. Lay out and cut to size one or two cards. Sizes may vary from 3"x 5" to $3\frac{1}{2}" \times 6"$.
- b. Put border along top or around the card with rule and pencil. Pen and ink or water color may be used in place of pencil.
- c. Address the card to self or to a friend. If to be used to send a message to a friend, the note may be written and the stamp affixed in class, and information given regarding postal rates and the postal system.

TO DRAW

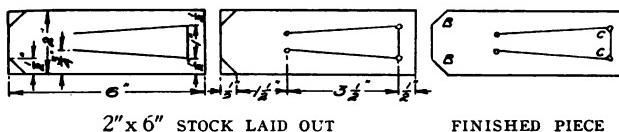
AN ALPHABET

PAPER AND CARDBOARD CONSTRUCTION

332. Page Holder.

Heavy cover paper, 1 piece, 6"x 9" (or 3"x 6").

Rule, pencil, scissors, punch. A few punches will be enough for the whole class.



DIRECTIONS:

- Lay out vertical measurements. See first drawing.
- Lay out horizontal measurements and punch four holes as illustrated. See second drawing.
- Cut inside lines for tab, cut corners from tab at C C, and cut outside corners B B. See last drawing.

NOTE:—Two of these may be made, or one may be changed to other proportions. If the 3"x 6" stock be used, only one can be made of the given size. The use of the page holder as a marker in a book or magazine is obvious.

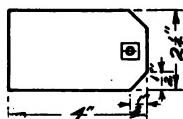
333. Shipping Tags.

Heavy tag board, 1 piece, 6"x 9".

String, 1 piece 10" long, for fastening.

Glue.

Rule, pencil, scissors.



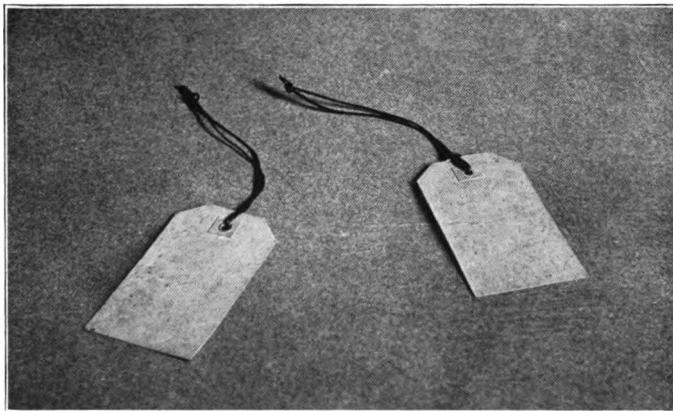
TAG LAID OUT TO SIZE

DIRECTIONS:

- Cut four pieces of tag board each $2\frac{1}{4}'' \times 4''$.
- Cut eight pieces of tag board each $\frac{1}{2}'' \times \frac{1}{2}''$.
- Draw center lines lengthwise of each large piece.

CARD PROBLEMS

- d. At two end corners lay off points $\frac{1}{2}$ " each way and connect these points with lines. See right end of drawing.
- e. Cut on these lines.



SHIPPING TAGS

- f. On center line $\frac{1}{2}$ " from the end, glue one of the small pieces of tag board. Glue another on the other side directly under the first square.
- g. Punch a hole thru these squares when the glue is dry.
- h. Pieces of string or wire may be put in ready for use.

NOTE:—Very often there are small pieces of tag board that are left from other exercises which may be used in making the shipping tags. It may be well in small classes to use an eyelet to add strength. Other shapes may be made, especially with increase in length.

431. Postal Scale.

Marble board, 1 piece, 6"x9".

Bristol board, 1 piece, 6"x9".

String, 1 piece, 30" long.

Top shot wad or small square of marble board.

PAPER AND CARDBOARD CONSTRUCTION

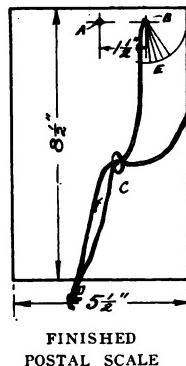
Heavy tag board, 30 pieces, 3"x6". For use of entire class for weights.

Glue, 2 eyelets.

Rule, pencil, scissors, punch, compass. A strip of paper with a pin thru one end and a pencil point thru the other will serve for a compass.

DIRECTIONS:

- a. Cut one piece of marble board $5\frac{1}{2}'' \times 8\frac{1}{2}''$.
- b. Cut one piece of bristol board same size.
- c. Rub a thin coat of glue on the marble board, place bristol board on the glued surface and press hard. Glue must be spread evenly and boards placed under a heavy weight.
- d. When glue is dry, draw center line lengthwise of bristol board.
- e. Measure down $\frac{1}{2}''$ on center line for hole at A. Punch and set eyelet.
- f. Locate hole at B. Put in eyelet $\frac{1}{2}''$ from top and $1\frac{1}{2}''$ from center line.
- g. Cut one piece of string about 6" long and tie in hole at A. This is to be made into a loop for hanging.
- h. Thread the remaining string thru the hole at B.
- i. Punch a small hole in the center of the paste board shot wad and thread both ends thru it. Tie a knot at the ends of the string at D.
- j. Locate the lines at E as follows: Take as many pieces of tag board 3"x6" as will weigh one ounce and place in the string at F; now suspend the scale by the short string in A and place a point at E which shall represent one ounce on the scale. A two ounce mark or a half



FINISHED
POSTAL SCALE

CARD PROBLEMS

ounce mark may be located in the same manner with the proper number of card weights.

NOTE:—This scale may be used to weigh letters and parcels up to two or three ounces and if made carefully is quite reliable. If possible, the work should be placed in some sort of clamp or press as soon as it is glued. If nothing better be available heavy weights may be used. Always place clean pieces of paper on each side of the work while it is being pressed.

If a simpler process be desired, a piece of heavy tag board or heavy bristol board may be used alone, thus doing away with the difficulty of gluing.

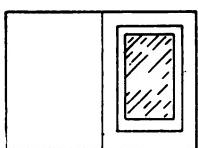
432. Folder Picture Mount.

Heavy cover paper, 1 piece, 6"x 9". Or 9"x 12" if necessary.

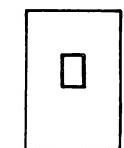
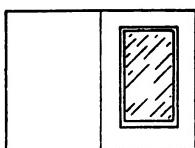
Cover paper, 1 piece, 6"x 9". Of different color than above.

Paste.

Rule, pencil, scissors.



TWO FOLDERS OPEN TO SHOW MOUNTING



FOLDER CLOSED

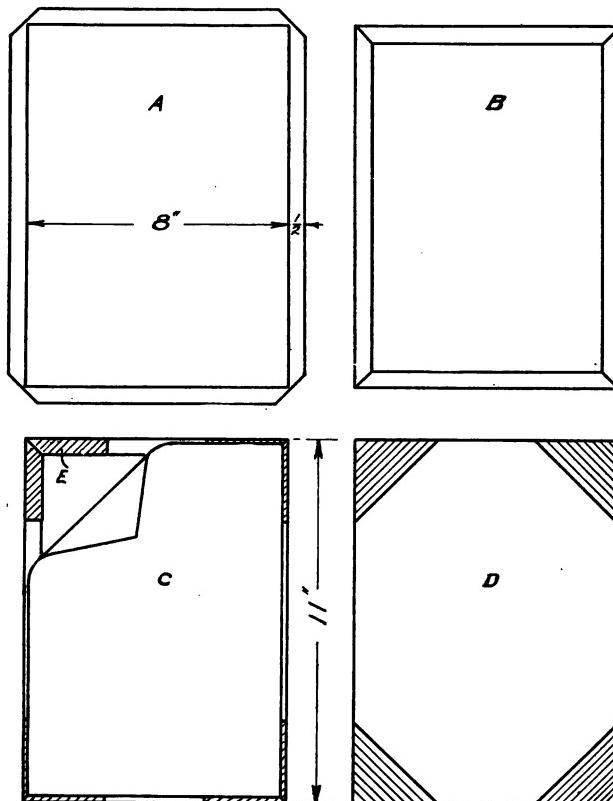
DIRECTIONS:

- a. Cut inside mount for picture and paste at top. Allow a little distance at sides and top and rather more at the bottom, being sure that the color goes well with the picture.
- b. Cut outside folder, crease, and paste mounted picture on right inside page of folder. Select color that will go well with both picture and inside mount, and be careful of proportions.

PAPER AND CARDBOARD CONSTRUCTION

- c. Outside of folder may be given a simple decoration if desired. See drawing at right on page 105.

NOTE:—If intended to stand upon a shelf or table it will be better to use mounting board or heavy mounting paper in place of the cover paper.



STEPS IN MAKING DESK PAD—8"x 11"

CARD PROBLEMS

433. Desk Pad.

Strawboard, 1 piece, 8"x 11", cut from 9"x 12".

Heavy cover paper, 1 piece, 9"x 12".

Heavy cover paper (different color), or binders' cloth, 1 piece, 6"x 9".

Thin cover paper, 1 piece, 9"x 12".

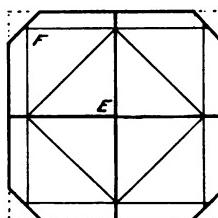
Blotting paper, 1 piece, 9"x 12".

Paste, glue.

Rule, pencil, scissors.

DIRECTIONS:

- a. Place the piece of heavy cover paper on the strawboard and cut the corners off as shown in the drawing at A. The corners should be cut far enough away from the corners of the strawboard so that when the paper is folded over the edges it will completely cover the strawboard at the corners.
- b. Paste the folded edges of the paper down to the strawboard as shown at B.
- c. Cut one piece of heavy cover paper, or the binders' cloth, $5\frac{1}{2}'' \times 5\frac{1}{2}''$ to make the four corners.
- d. Make the corners as follows: (See drawing below.)



1. Fold bottom edge to top edge and crease; open again.
2. Fold left edge to right edge and crease; open again.
3. Fold in each edge about $\frac{1}{2}''$ and crease; open again.
4. Cut off corners within $\frac{1}{8}''$ of intersections of last folds.

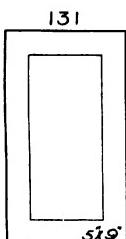
PAPER AND CARDBOARD CONSTRUCTION

5. Cut on the folds thru the center of the sheet which will divide the paper into four equal parts.
6. Fold "E" to "F" in each section.
- e. Fasten corners in place using paste or glue under folds only, as shown at E on page 106.
- f. Cut one piece of thin cover paper $7\frac{3}{4}'' \times 10\frac{3}{4}''$.
- g. Paste this in place and press firmly as at C. The front of the desk pad is shown at D.

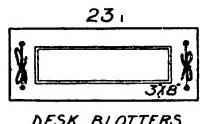
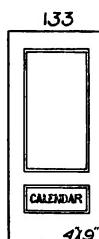
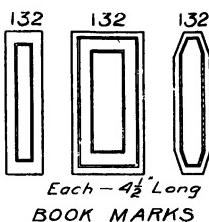
NOTE:—A sheet of blotting paper $8'' \times 11''$ may be cut and placed at D if desired. In addition to the desk pad, it may be well to make large mounts for blue-prints and charts and other illustrative material.

Upon the opposite page are shown drawings of the full number of card problems which have been suggested.

CARD PROBLEMS



MOUNTED DRAWINGS



DESK BLOTTERS

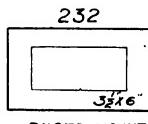


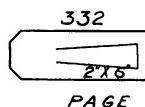
PHOTO MOUNT



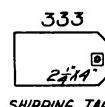
GLASS COVER



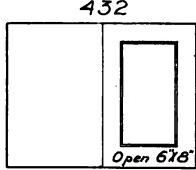
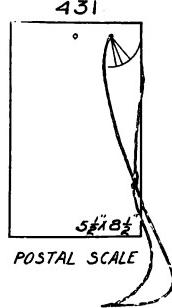
POST CARD



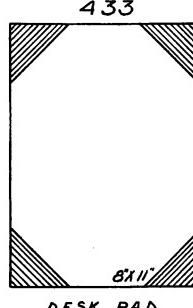
PAGE HOLDERS



SHIPPING TAG



FOLDER PICTURE MOUNT



DESK PAD

CARD PROBLEMS ARRANGED BY GRADES

V

ENVELOPE PROBLEMS

ENVELOPES and paper bags are typical problems for paper construction and are varied enough in shape to suit the abilities of pupils of different ages. The making of envelopes is of importance industrially, altho, of course, automatic machinery takes the place of most of the hand processes. Yet there is enough similarity between the hand and the machine process to make the type of construction evident. Careful "laying out", cutting, folding, and gluing are necessary for successful work and must be insisted upon at all times.

To keep up the interest in the making of envelopes, several forms are introduced, and the uses of the finished envelopes are different. Mailing envelopes are made in many shapes and sizes and from different materials. Filing envelopes are made in different proportions to fit particular uses, and increasing in difficulty as different school grades are reached. Paper bags are included with the envelope problems as they are of the same general character.

Many uses for the envelopes and bags will suggest themselves, and different constructions may be made as other needs appear. It is hoped that teachers will find in these outlines constant hints for new ways to attack the problems in paper and cardboard work, but it is also expected that a reasonable number will always have a definite line of problems to present to pupils, and will not hesitate to give such directions as will make the work clear to the pupil. More freedom may well be allowed in the uses of the envelopes as made, than in the methods of making them. As suggested for the card problems, there is a good deal of illustrative material which should be saved for future reference, and which if mounted or saved in envelope files would be convenient of access as needed. Certain of the envelope files will be found convenient for newspaper clippings, and others for magazine illustrations.

The arrangement of envelope problems by grades is as follows:

ENVELOPE PROBLEMS

FIRST GRADE

- 141 Envelope folder (Thin tag board or heavy cover paper).
- 142 Square envelope (Book paper or cover paper).
- 143 Pocket for clippings (Thin tag board).

SECOND GRADE

- 241 Paper bag (Thin cover paper or manila wrapping-paper).
- 242 Mailing envelope (Bond paper or flat writing-paper).
- 243 Long mailing envelope (Bond paper).

THIRD GRADE

- 341 Photo filing envelope (Light or medium tag board).
- 342 Long filing envelope (Medium tag board).
- 343 Large filing envelope (Medium or heavy tag board).

FOURTH GRADE

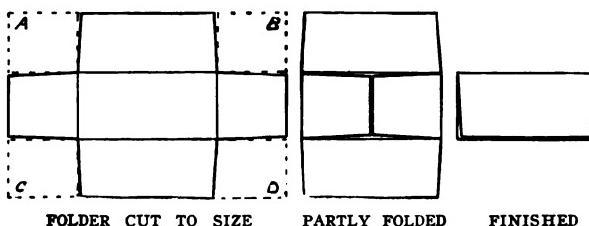
- 441 Paper bag with folds (Thin cover paper).
- 442 Flat envelope file (Medium tag board, binders' cloth, cloth board, marble paper).
- 443 Book envelope file (Medium tag board, cloth board, binders' cloth, marble paper).

141. Envelope Folder.

Thin tag board or heavy cover paper, 1 piece, 6"x9".

Paste.

Rule, pencil, scissors.



DIRECTIONS:

- a. Place the sheet of paper with the long edges in a horizontal position.

PAPER AND CARDBOARD CONSTRUCTION

- b. Fold left edge nearly to center of sheet and crease.
- c. Fold right edge nearly to center of sheet and crease.
- d. Open to original position.
- e. Fold bottom edge up nearly two-thirds of the distance to the top edge and crease.
- f. Fold top edge down nearly to folded edge at bottom, crease and open.
- g. Cut away corners as indicated in drawing at A, B, C, D. These cuts may be made at an angle as shown in drawing, or they may be made on folded lines.
- h. Refold all parts.

NOTE:—Different shaped folders should be made if time permits. It may be well to apply paste for a space about one-half inch in width along the inside edge of bottom lap and press firmly in place to make a regular envelope in place of the envelope folder.

142. Square Envelope.

Book paper or cover paper, 1 piece, 9"x 12".

Paste.

Rule, pencil, scissors.

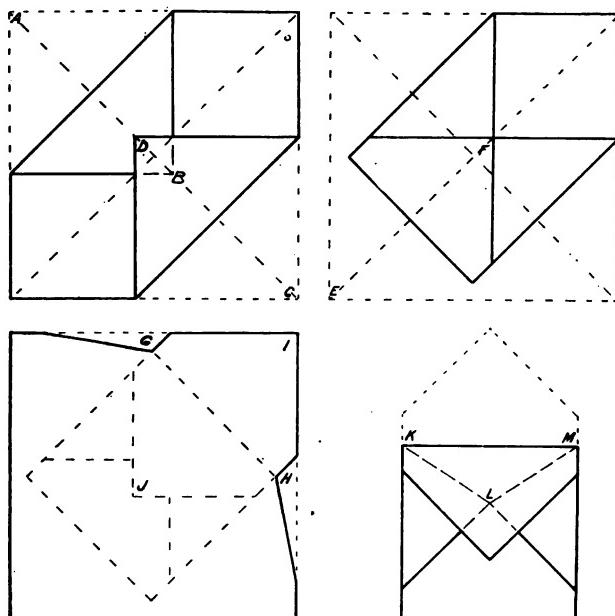
DIRECTIONS:

- a. Fold one short edge to one long edge and crease on diagonal fold.
- b. With paper in this position cut away the three-inch strip. This leaves the paper 9" square.
- c. Fold the other diagonal.
- d. Fold A to B, and C to D, as shown in first drawing.
- e. Fold bottom up,—E to F, as shown in second drawing.
- f. Fold top down,—I to J, as shown in third drawing.
- g. Open top part back to original position, and with rule draw pencil line from K to L, and M to L.
- h. Open all folds and cut away portions G and H.
- i. Fold in sides and paste at D.

ENVELOPE PROBLEMS

- j. Apply paste at edges of bottom fold and press into place.

NOTE:—Step "h" may be omitted to simplify the work and the paper left square but the folds will be more clumsy.



STEPS IN MAKING SQUARE ENVELOPE

143. Pocket for Clippings.

Thin tag board, 1 piece, 9"x 12".

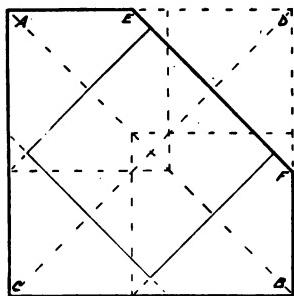
Paste.

Scissors.

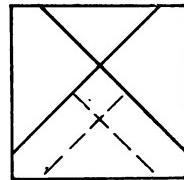
DIRECTIONS:

- a. Cut sheet to 9"x 9" as directed in 142, "a" and "b".
- b. Fold other diagonal.
- c. Fold in the four corners about one-half inch past the center of the sheet, and in the following order,—A, B, C, D, as shown in drawing.

PAPER AND CARDBOARD CONSTRUCTION



POCKET CUT TO SIZE



POCKET FOLDED

- d. Unfold top part, D.
- e. Cut on fold E F.
- f. Paste as in 142.

241. Paper Bag.

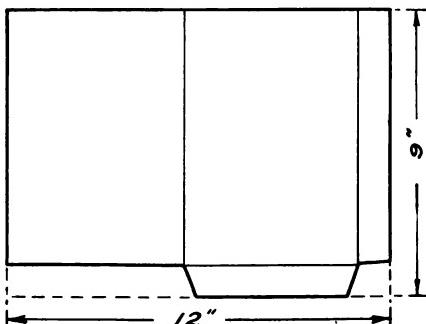
Thin cover paper or manila wrapping-paper, 1 piece,
9"x 12".

Paste.

Rule, pencil, scissors.

DIRECTIONS:

- a. Place the sheet of cover paper with the long edges in a horizontal position.

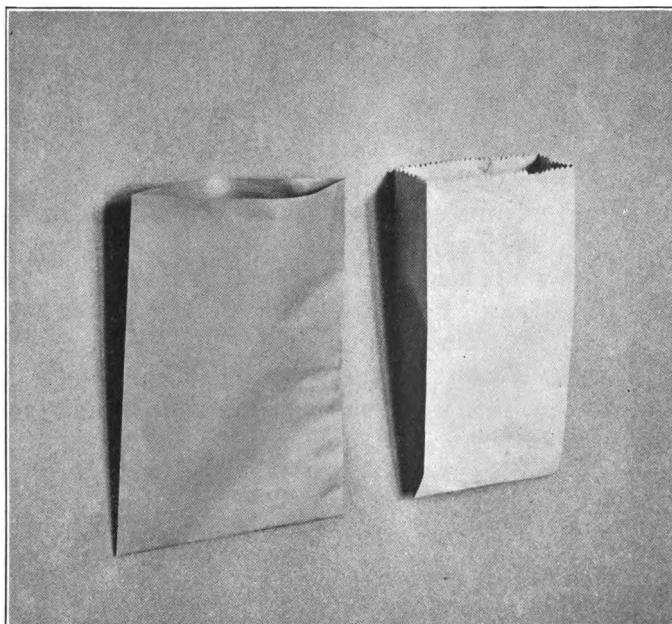


PAPER BAG CUT TO SIZE

ENVELOPE PROBLEMS

- b. Fold the left edge to within about one inch of the right edge and crease.
- c. Fold the remaining one inch to the left and crease.
- d. Fold the bottom up about one inch and crease.
- e. Open the whole sheet and cut away the parts as shown in the drawing.
- f. Refold in the same order and paste the laps on the outside.

NOTE:—If desired, small notches may be cut in the top edge after it is pasted to give a closer resemblance to the usual form.



PAPER BAGS

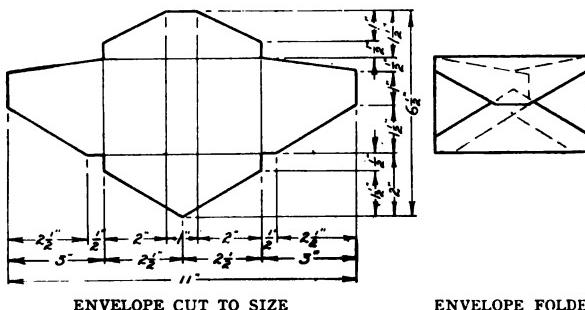
PAPER AND CARDBOARD CONSTRUCTION

242. Mailing Envelope.

Bond paper or flat writing-paper, 1 piece, 9"x 12".

Paste.

Rule, pencil, scissors.



DIRECTIONS:

- a. With the sheet on desk and long edges in horizontal position, lay out as indicated in drawing. The following order is suggested:
 - (1) Locate and draw horizontal lines, making measurements from the bottom of the sheet.
 - (2) Locate and draw vertical lines, making measurements from left edge of sheet.
 - (3) Locate and draw slanting lines.
- b. Call attention to all cutting lines and consider shape.
- c. Cut to lines.
- d. Fold on light lines.
- e. Consider final shape.
- f. Paste end laps.
- g. Paste bottom lap.

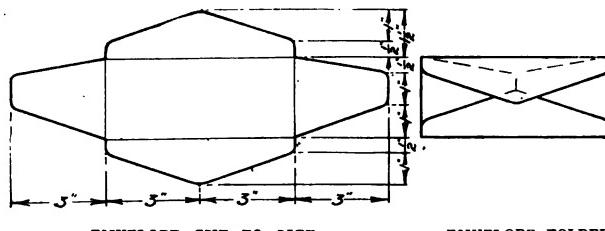
243. Long Mailing Envelope.

Bond paper, 1 piece, 9"x 12".

Paste.

Rule, pencil, scissors.

ENVELOPE PROBLEMS



DIRECTIONS:

- a. Lay out in same manner as 242. Do not consider rounded corners until whole problem is laid out in straight lines.
- b. Lay out rounded corners with pencil without measurements. The teacher should show on the blackboard how much the corners are to be rounded.
- c. Cut to shape.
- d. Fold and paste as in 242.

341. Photo Filing Envelope.

Light or medium tag board, 1 piece, 6"x9".

Glue.

Rule, pencil, scissors.

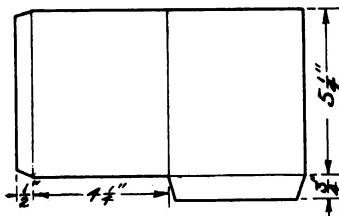
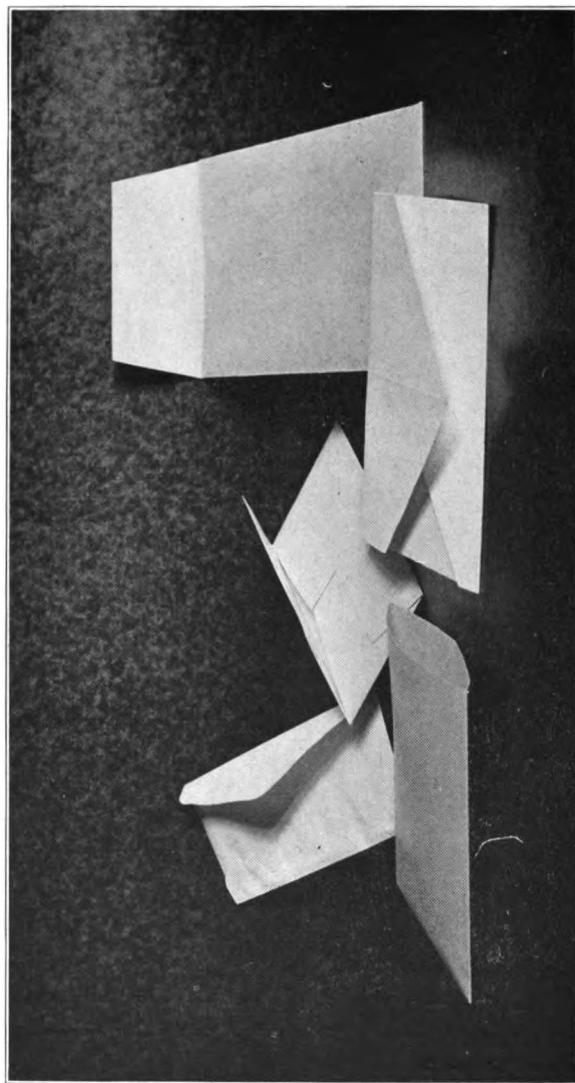


PHOTO FILING ENVELOPE

DIRECTIONS:

- a. Locate and draw lines for folds as indicated in the drawing,—the first $\frac{1}{2}$ " and the second $4\frac{1}{4}$ " from the left edge.
- b. Locate and draw a line $\frac{3}{4}$ " from the bottom edge and parallel to it.
- c. Draw the short slant lines as indicated.

PAPER AND CARDBOARD CONSTRUCTION



MAILING AND FILING ENVELOPES

ENVELOPE PROBLEMS

- d. Consider the shape to which the material is to be cut.
- e. Cut on lines indicated.
- f. Fold on light lines and consider final appearance.
- g. Spread glue on laps and press firmly in place.

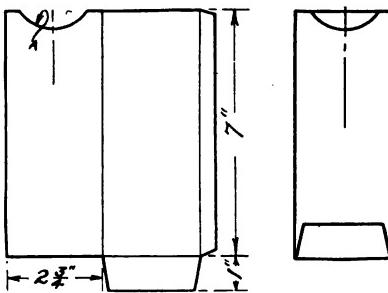
NOTE:—The bottom should be folded up on the outside, while the lap on the side may be folded either on the inside or on the outside. This envelope is suitable for filing 4"x 5" dry plates or films or unmounted photographs. Mounted photographs not over 4 $\frac{1}{8}$ "x 5 $\frac{1}{8}$ " can be filed comfortably in an envelope of this size.

342. Long Filing Envelope.

Medium weight tag board, 1 piece, 6"x 9".

Glue.

Rule, pencil, compass, scissors.



LONG FILING ENVELOPE

DIRECTIONS:

- a. Lay out lines for folds and cuts according to dimensions on the drawing. The order of procedure is suggested by directions in number 341.
- b. Draw center line as shown in drawing.
- c. With compass set at 1 $\frac{1}{4}$ " radius describe an arc as shown at A. The center for this arc will be outside the sheet of tag board and any piece of waste paper may be used on which to extend the center line. The location of this center may be determined by the pupil.
- d. Cut, fold, and glue in same manner as in number 341.

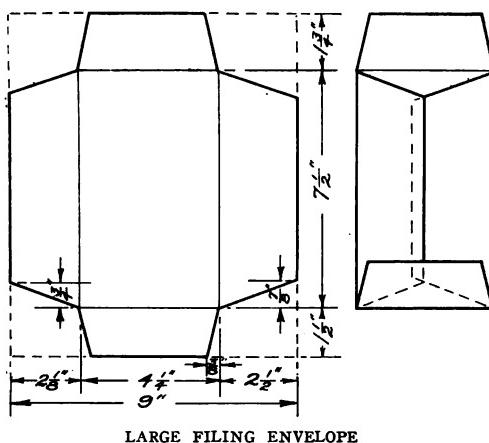
PAPER AND CARDBOARD CONSTRUCTION

343. Large Filing Envelope.

Medium or heavy tag board, 1 piece, 9"x 12".

Glue.

Rule, pencil, scissors.

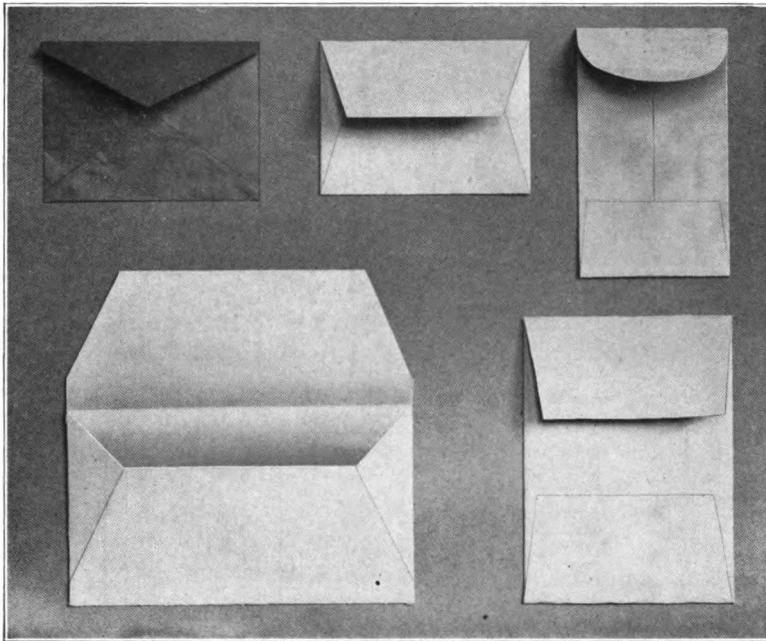


LARGE FILING ENVELOPE

DIRECTIONS:

- a. Place the sheet of tag board on the desk with the short edges in a horizontal position.
- b. Begin at left edge and make measurements on both top and bottom as follows,— $2\frac{1}{8}$ " from left edge, $4\frac{1}{4}$ " from last point located, then $2\frac{1}{2}$ " from last point.
- c. Draw vertical lines thru these points.
- d. In the same manner locate and draw the horizontal lines.
- e. Locate points and draw lines for the slanting cuts.
- f. Consider final shape before cutting.
- g. Cut to shape indicated by heavy lines.
- h. Fold on light lines.
- i. Consider the construction of the finished envelope as shown in the second drawing.
- j. Apply a thin coat of glue to the laps and press firmly in place. The top lap is left without gluing.

ENVELOPE PROBLEMS



ENVELOPES

441. Paper Bag with Folds.

Thin cover paper, 1 piece, 9"x 12".

Paste.

Rule, pencil, scissors.

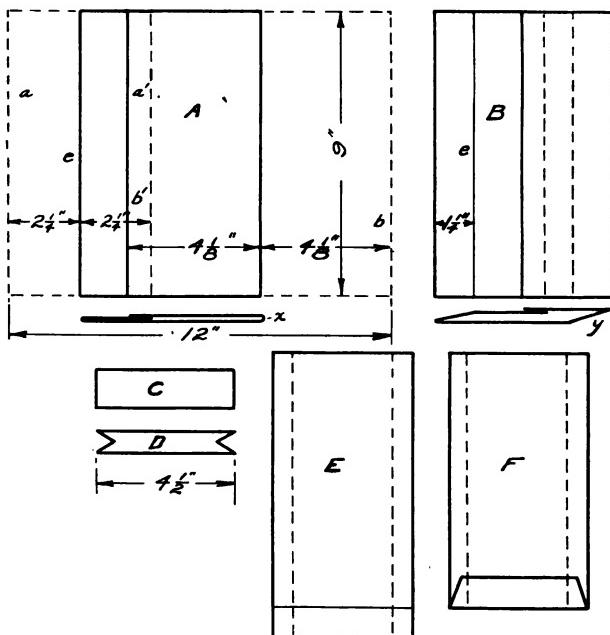
DIRECTIONS:

- a. Place the sheet on the desk with the long edges in a horizontal position.
- b. Measure from lower left corner to right $4\frac{1}{2}$ " and fold left edge to this point.
- c. Measure from lower right corner to left $8\frac{1}{4}$ " and fold

PAPER AND CARDBOARD CONSTRUCTION

right edge to this point, x represents the end view when folded.

- d. Paste the lap from end to end.



STEPS IN MAKING PAPER BAG WITH FOLDS

- e. When the paste is sufficiently dry move the lap joint to the right $1\frac{1}{4}$ " and crease edges in this position. This is shown in B, and in end view "y".
- f. Note now that the opening is in rectangular form as at C which is an end view.
- g. Fold in sides as shown at D and press flat.
- h. Fold up bottom about 1" as at E.
- i. Cut away the unnecessary material in this fold and paste as shown in F. Only one thickness of paper should be left to paste.

ENVELOPE PROBLEMS

442. Flat Envelope File.

Medium tag board, 4 pieces, 9"x 12".

Cloth board, 1 piece, 9"x 12". These may be cut to sizes required.

Binders' cloth, 1 piece, 6"x 18".

Marble paper, 1 piece, 9"x 12".

Paste, glue.

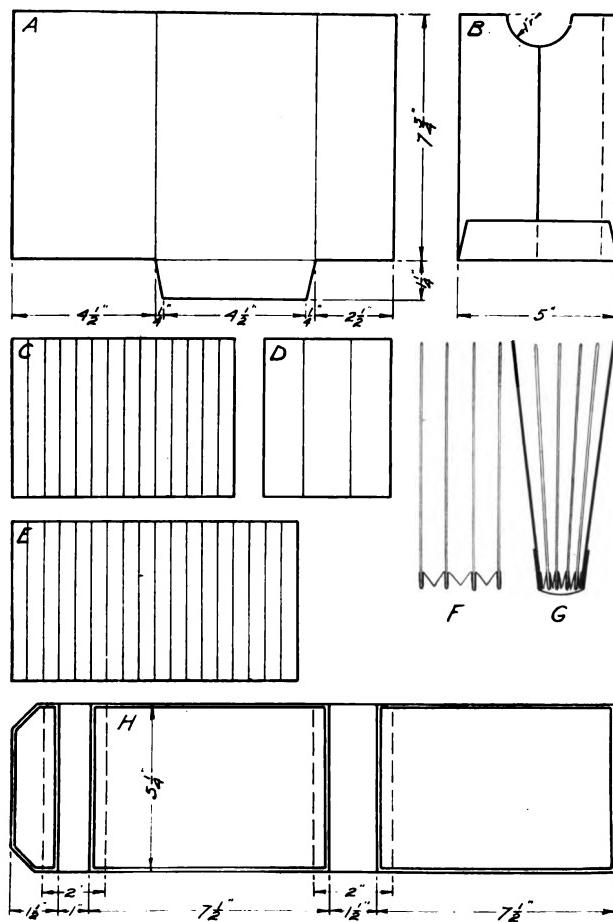
Rule, pencil, scissors.

DIRECTIONS:

- a. Lay out four envelopes from tag board according to dimensions in drawing.
- b. Fold on light lines with part A folded first. This brings the visible edge of the joint in the center of the envelope as shown in drawing at B.
- c. Fold up bottom lap.
- d. Glue each joint carefully and place under a weight until dry.
- e. Lay out curve at top end of envelope and cut to line as shown at B.
- f. Cut binders' cloth to size for the folded hinge at bottom ends of envelopes. At F and G are shown two methods of hinging. At F the file is used without the cover boards, while at G the folded hinge is fastened into a cloth covered case. Another form of this case is shown at H with a lap around one end, this being the form for which material is included in foregoing list. If hinge is to be made as at F, cut the binders' cloth as shown at C, 5"x 7" and make folds $\frac{1}{2}$ " apart alternating up and down; if as at G, cut as shown at E, 5"x 9" and fold in same manner.
- g. Apply glue to envelopes and set into folds of binders' cloth. See illustrations at F and G.

NOTE:—If a cover is desired it may be made as shown at G by fastening two pieces of cloth board or marble board together with a piece of binders' cloth 4"x 5" D, and gluing the hinges on

PAPER AND CARDBOARD CONSTRUCTION



THREE STEPS IN MAKING FLAT ENVELOPE FILE

the inside of the board covers. Another form of cover is shown at H. Here binders' cloth may be used for the hinges only or the whole cover may be covered with it. Corners may also be made as an additional problem. Covers should be lined with marble paper.

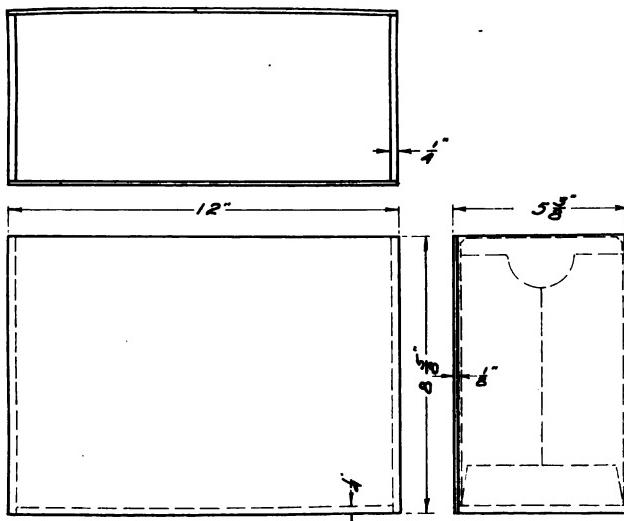
ENVELOPE PROBLEMS

If much filing is to be done a filing case as shown in the drawing below will be found convenient.

This case is made as follows:

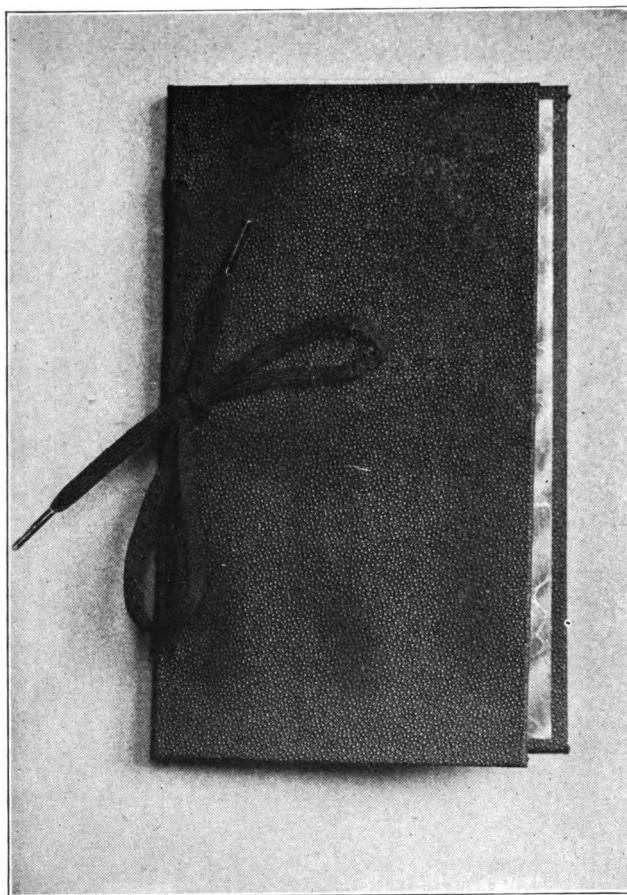
- a. Cut soft wood base $\frac{1}{4}'' \times 5\frac{1}{8}'' \times 11\frac{1}{2}''$.
- b. Cut two soft wood ends $\frac{1}{4}'' \times 5\frac{1}{8}'' \times 8\frac{3}{8}''$.
- c. Cut two cloth board sides each $8\frac{5}{8}'' \times 12''$. Use No. 15, 20 or 25 stock.
- d. Fasten the ends of the base with $1\frac{1}{4}''$ brads.
- e. Fasten the sides to ends and base with $\frac{3}{4}''$ flat heads, thin.
- f. Cover corners with stay tape or $1\frac{1}{4}''$ strips of binders' cloth.
- g. Cover sides and ends with marble paper or cover paper.

It may seem desirable to line the case with marble paper or cover paper to make a better inside appearance. In this case, either the outer or inner paper should be carried over the top edge.



DESK FILING CASE FOR $5'' \times 7\frac{3}{4}''$ ENVELOPES

PAPER AND CARDBOARD CONSTRUCTION

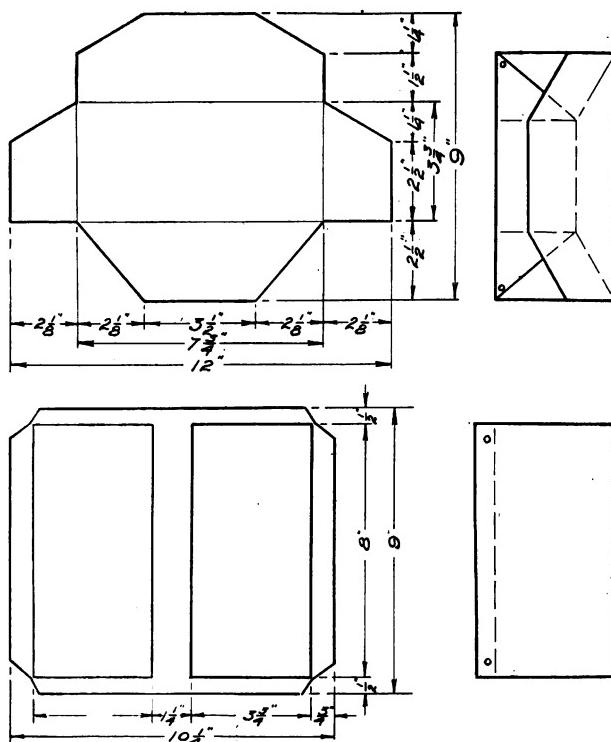


BOOK ENVELOPE FILE

443. Book Envelope File.

Medium weight tag board, 4 pieces, 9"x 12".
Cloth board, 2 pieces, 3 $\frac{3}{4}$ "x 8" (cut from 9"x 12").
Binders' cloth, 1 piece, 9"x 12".
Marble paper, 1 piece, 9"x 12".
Paste, glue, eyelets, string.
Rule, pencil, scissors, eyelet punch.

ENVELOPE PROBLEMS



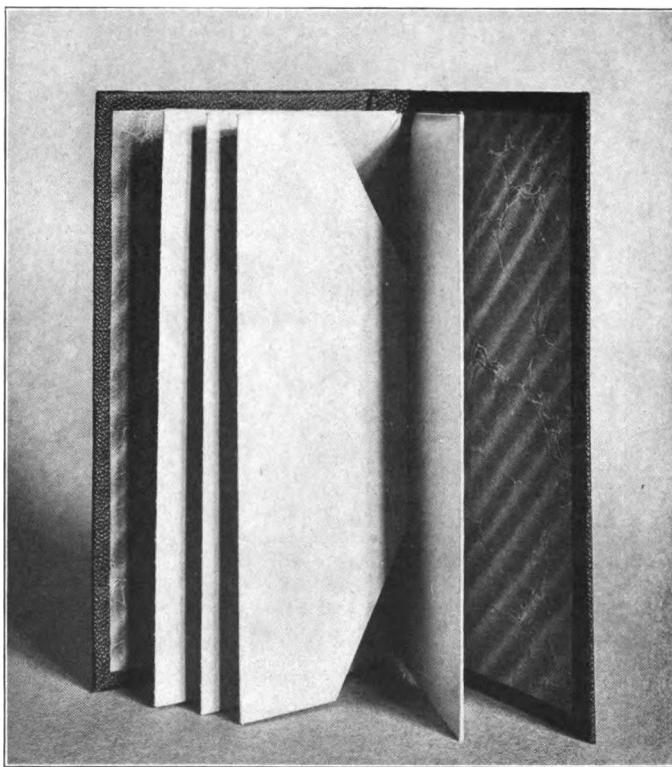
ENVELOPE AND CASE FOR BOOK ENVELOPE FILE

DIRECTIONS:

- a. Lay out four envelopes from tag board according to dimensions given in drawing. For order of operations in laying out envelopes see number 242, on page 102.
- b. Fold and glue. Fasten bottom lap over end laps as illustrated above.
- c. Punch holes and set eyelets in envelopes. Locate holes near bottom corners.
- d. Cut binders' cloth to 9"x 10 1/4". Save remaining strip for "i" on page 129.

PAPER AND CARDBOARD CONSTRUCTION

- e. Place the two pieces of cloth board on the binders' cloth and make pencil lines around them. Make sure that the distance between the boards is the same ($1\frac{1}{4}$ ") at both top and bottom.



BOOK ENVELOPE FILE

- f. Cut the corners away as shown. Enough cloth should be left at the corners so that when it is folded it will completely cover the cloth board.
- g. Apply glue to the cloth board and press into place. Glue must be spread thinly and evenly.

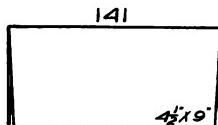
ENVELOPE PROBLEMS

- h. Fold the cloth over edges of boards, and glue.
- i. From remaining strip of binders' cloth, cut a piece $1\frac{3}{4}'' \times 7\frac{3}{4}''$. This is to be glued down the center of the back, inside, to make the hinge stronger and more durable.
- j. Cut two pieces of marble paper $3\frac{1}{2}'' \times 7\frac{3}{4}''$.
- k. Paste marble paper inside of covers $\frac{1}{8}''$ from edges.
- l. Punch holes in cover in such positions as will coincide with the holes in the envelopes, and set eyelets. There should be a margin between the outer edges of the envelopes and the edges of the cover of about $\frac{1}{8}''$.
- m. A shoe lace or piece of strong black cord may be used to hold envelopes in place in the cover.

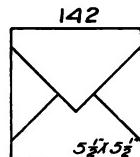
NOTE:—The envelope problems suggested on the preceding pages represent some variety in an important line of paper construction. Other styles and shapes will suggest themselves.

On the next page the full sequence of envelope problems is arranged for comparative study.

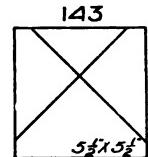
PAPER AND CARDBOARD CONSTRUCTION



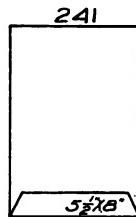
ENVELOPE FOLDER



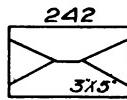
SQUARE ENVELOPE



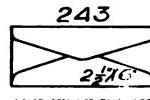
POCKET FOR CLIPPINGS



PAPER SACK



MAILING ENVELOPE



LONG MAILING ENVELOPE

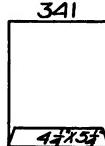
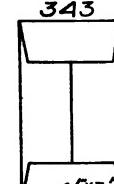


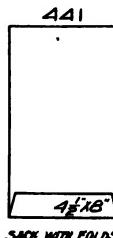
PHOTO FILING ENVELOPE



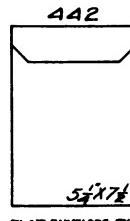
LONG FILING ENVELOPE



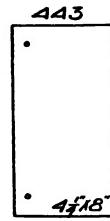
LARGE FILING ENVELOPE



SACK WITH FOLDS



FLAT ENVELOPE FILE



BOOK ENVELOPE FILE

ENVELOPE PROBLEMS ARRANGED BY GRADES

VI

PLANNING OF COURSES

WHILE the preceding chapters describe what may seem to be desirable sequences for use in schools, the authors do not wish to recommend that all teachers who use the book shall follow such an arrangement, but prefer to have the book suggestive to any one who may have the work of planning courses in paper and cardboard construction. Such courses will vary as the point of view varies. The educational ideals of a community, the requirements of a superintendent, or the particular interests of the supervisor may affect the whole scheme of organization. After an analysis of the fundamentals in planning a course and a brief statement of some of the recognized points of view, four schemes are given as typical outlines of courses of study.

FUNDAMENTALS IN PLANNING

In planning a course of study in any subject, the first matter demanding attention is the formulation of definite aims which may be accomplished by means of the course. The more definite and specific these become the better can a course be adjusted to meet them. The ideals of the local school system may form the background for this determination, the point of view of its officers, and the training and experience of the special supervisor must all be considered; the details of the regular course of study and of the school administration and the wishes of teachers in the lower grades all affect the purpose and scope of the course, but these are only a starting point for a systematic statement of such particular aims as can reasonably be expected to have a place in a rational course of study.

The supervisor's first duty then is to determine the purpose of the course as a whole and the purposes of the different parts of such a course, either by grades or by principal divisions of the subject. Some of the purposes for the course as a whole are named on pages 134 to 137 as "The Point of View". The purpose

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back of this book is indicated in the introduction. Purposes for the principal divisions of paper and cardboard work as described here are given at the beginning of chapters II, III, IV and V.

The next matter requiring attention is the determination of the things which shall be made and what information shall be acquired in the progress of instruction. On pages 137 to 148 different arrangements of the course are indicated, and steps in the making of each problem are given on pages 19 to 130. This detailed analysis includes the number and name of each problem, the material and equipment needed by the pupil, a working drawing, directions for making the problem, and supplementary notes.

The planning of a course should at least be suggested by the supervisor altho many details may be left to the individual teacher. When it comes to methods of handling the work in the class room, they should be left largely or entirely to the teacher in charge of the room. The relations of the supervisor to the teacher are indicated in chapter VIII. It is important to remember here that as far as the planning of a primary handwork course is concerned, the supervisor must: (a) determine the purposes of the course, (b) outline the content of the course in its best arrangement of detail, (c) see that such methods are used as will bring proper results.

THE NUMBERING SYSTEM

In order that the supervisor may be able to indicate briefly the various problems in a course, it is desirable that some simple symbol be used, and a numbering system has been selected for use here. The numbering system thruout the book is as follows: There are three numbers employed for each problem and they read from the left as follows: 1 2 1 (one-two-one) square box. 4 3 3 (four-three-three) desk pad.

The first number, at the left, represents the grade in school:

- 1 (one) referring to the first grade.
- 2 (two) referring to the second grade.
- 3 (three) referring to the third grade.
- 4 (four) referring to the fourth grade.

PLANNING OF COURSES

The second number, in the middle, represents the group from which the problem is selected:

- 1 (one) referring to the group of book problems.
- 2 (two) referring to the group of box problems.
- 3 (three) referring to the group of card problems.
- 4 (four) referring to the group of envelope problems.

The third number, at the right, represents the intended sequence of the group in each grade:

1 or 2 or 3 referring to the first or second or third problem of the selected group and in the particular grade.

The following table represents the arrangement by grades and by groups.

	FIRST GRADE	SECOND GRADE	THIRD GRADE	FOURTH GRADE
Book Problems	I I I	2 I I	3 I I	4 I I
	I I 2	2 I 2	3 I 2	4 I 2
	I I 3	2 I 3	3 I 3	4 I 3
	I I 4	2 I 4	3 I 4	4 I 4
	I I 5	2 I 5	3 I 5	4 I 5
	I I 6	2 I 6	3 I 6	4 I 6
		2 I 7		4 I 7
Box Problems	I 2 I	2 2 I	3 2 I	4 2 I
	I 2 2	2 2 2	3 2 2	4 2 2
	I 2 3	2 2 3	3 2 3	4 2 3
			3 2 4	4 2 4
				4 2 5
Card Problems	I 3 I	2 3 I	3 3 I	4 3 I
	I 3 2	2 3 2	3 3 2	4 3 2
	I 3 3	2 3 3	3 3 3	4 3 3
Envelope Problems	I 4 I	2 4 I	3 4 I	4 4 I
	I 4 2	2 4 2	3 4 2	4 4 2
	I 4 3	2 4 3	3 4 3	4 4 3

Variations from this order are suggested on pages 142 to 148 but the numbers may still be used for purposes of classification.

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THE POINT OF VIEW

In the determination of purposes for the handwork course, the following points of view are significant:

The point of view in planning a course in primary handwork may be that of a logical arrangement of processes of handling materials so as to bring in a progress from easy to difficult, and to have each exercise prepare for the next. The use of the projects may take a secondary place or may correlate by running in a parallel direction, the work being modified so as to give the desired sequence and at the same time meet the uses which appear from time to time. Information regarding industrial phases of the work may be given in connection with the sequenced problems.

The point of view may be the grouping of types of construction with the emphasis placed upon a logical arrangement of processes as before or upon the meaning of the subject matter. The general arrangement of the problems in this book is of four groups distributed over the first four grades. Within each group there are sequences arranged in order of difficulty. There seems to be an advantage in this arrangement in the printed book as it enables the teacher to follow each group of problems from beginning to end. In a course of study, such an arrangement gives the child enough of each kind of problem to keep up the interest and to give an adequate view of the type of work.

The point of view may be that of the thought side involved and the projects be so planned that they will become a part of an organized study of details of selected industries. Handwork becomes in this case of secondary importance, and the informational values predominate. The making of things is then for illustrative purposes, to make ideas more definite, to give a more adequate notion of processes of manufacture, or to teach the nature of materials thru their manipulation. This informational value should always be present in some degree, but the emphasis may not always be placed upon the ideas involved.

PLANNING OF COURSES

The point of view may be the technical value of the skill involved in the making of the different projects. This skill may be the beginning of a general dexterity and control of the hand and eye or it may be the beginning of a special skill related to the particular type of work. This skill comes largely thru continued drill upon a few operations with a concentration of attention and effort. For a general dexterity and fundamental training of the hand as a foundation for special skill in later work, two or three repeats should generally be enough. These must require the best interest and diligence of which the pupil is capable, for real growth. For special skill in the particular operations it is necessary to repeat a process many times, or until it becomes nearly automatic, and this usually has no place in the public schools, or at least not in the lower grades. Where this special skill is desired, many of the problems suggested in this book will be found of value in repeat work. It must be recognized however that commercial processes include devices and kinks which save time and labor, and where many repeats are looked for, these should be employed. References covering this subject are indicated in the bibliography.

The point of view may be as an aid to art teaching, the providing of small objects suitable for decoration, or furnishing an outlet for the design of paper and cardboard work. Too often does the art teacher find it difficult to give adequate directions for making boxes, booklets, envelopes, and card problems, and the outlines here given will aid in such work and enable the art teacher to plan parallel courses in drawing and construction. The paper and cardboard construction in this case assumes a position supplementary to the drawing course, and may have its arrangement determined by the organization of the work in drawing.

The point of view may be that of an aid to teaching any or all of the regular elementary studies, and such problems may be selected as will meet needs of the class room as they appear from time to time. As an example, a scrap-book may be made when

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collections of illustrative material need a permanent mounting. It is important here to realize that only such work should be given as will meet the range of the pupil's ability. Such work in any case loses all of its definiteness and becomes unsystematic, but may be of service to other subjects so as to warrant its becoming a small part of a public school course.

The point of view may be that of method in teaching, and the planning of the primary courses in handwork may have as its first consideration the handling of the work in class, including the method of presentation, a study of the cost and care of equipment and supplies, and the apportionment of time to the different branches. Handwork may be a method only and have no special content of its own. Of the things which seem desirable to teach in the elementary school, it is found that some can best be taught in the handwork class. Of the habits which seem desirable to train, it is found that some can be well emphasized in the handwork class. Thus handwork in some places has no identity as a subject, but is a way of handling certain other school subjects.

The point of view may be the building around centers of interest. Such features of social activity as occupations, civic life, the home, and holidays may become central thoughts in a part of the elementary curriculum, and stories, number work, descriptions, drawing, and the making of things all serve to add meaning to the ideas involved. This studying of the interests of children with the endeavor to meet them has become the most significant feature in many schools, and details of the course have been modified as needed to meet these interests. In such places the suggestion of such problems as are described in this book does not need to concern itself with any logical arrangement of processes.

Whatever the point of view, the planning of a course is one of the important functions of the supervisor of primary handwork and should be given its due consideration. The determination of the purpose or point of view, the outlining of such details of the course as will carry out the purpose, and the making of sug-

PLANNING OF COURSES

gestions of methods for handling these details belong to the supervisor.

ARRANGEMENT OF PROBLEMS

There are different ways of grouping the problems in each grade, so as to bring in a sequence of manipulations of increasing difficulty. It is also possible to arrange several sequences, each more or less independent of the others but enabling the pupil to profit constantly from his previous efforts. Four arrangements are suggested:

- A. First grade:—book problems, box problems, card problems, envelope problems.
Second grade, third grade, and fourth grade:—same grouping as for first grade but with added difficulty in each grade.
This grouping is the most systematic and logical.
- B. Each grade:—a problem or two from each group above, and then a repeat from each group.
These changes may seem desirable for the sake of variety and interest.
- C. Each grade:—a selection of problems from each group arranged in the order of difficulty for the entire scheme regardless of the classification of problems.
This arrangement may seem a little disjointed in content, but furnishes a very definite line of training for the child and may prove more interesting than "A" or "B".
- D. First and second grades:—arranged as in "A", "B", or "C".
Third and fourth grades:—a concentration upon one or two groups of problems for most of the work of an entire year.
This arrangement furnishes a training in technical skill not possible with the other arrangements.

A

PROBLEMS GROUPED FOR EACH GRADE

Groups of problems for each grade are outlined below as suggested at "A". The full arrangement of problems with a statement of the new processes or those especially emphasized in each problem, by grades, is given below. It is understood that nearly every problem involves some repeat of former processes, besides the new processes. Many of the problems may be omitted if

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there is not enough time, but some problems should be taken from each group.

FIRST GRADE

BOOK PROBLEMS

- I. 111. Mounting folderspage 19
Folding, creasing, cutting picture, pasting picture.
- II. 112. Booklet folderpage 20
Tearing edge, gluing or pasting narrow edge.
- III. 113. Pocket note-bookspage 21
Folding for 8, 12 and 16 pages, sewing single section thru three holes, tearing leaves apart.
- IV. 114. Book of color schemespage 24
Study of color samples, selection of colors, mounting colors.
- V. 115. Drawing-bookpage 25
Folding wide opening book, making drawings in book.
- VI. 116. Laundry listpage 27
Fastening eyelet, tying cord, writing title on outside.

BOX PROBLEMS

- VII. 121. Square boxpage 67
Folding stiff material, gluing square corners.
- VIII. 122. Square traypage 68
Folding and gluing narrow folds.
- IX. 123. Rectangular traypage 69
Folding, cutting, and gluing heavy material.

CARD PROBLEMS

- X. 131. Mounted drawingspage 92
Studying proportions and mounting with paste.
- XI. 132. Book-markspage 93
Determining outline and planning border, making line with pencil or crayon.
- XII. 133. Calendarpage 94
Mounting of picture and calendar together.

ENVELOPE PROBLEMS

- XIII. 141. Envelope folderpage 111
Folding and cutting to folded line, and cutting off slant edge.
- XIV. 142. Square envelopepage 112
Folding accurately to line and pasting neatly.
- XV. 143. Pocket for clippingspage 113
Careful cutting to folded lines.

PLANNING OF COURSES

SECOND GRADE

BOOK PROBLEMS

- I. 211. Paper portfoliopage 29
Measuring for length, connecting points with pencil, and using stay tape over crease.
- II. 212. Paper portfolio with lapspage 30
Measuring for length, three dimensions, laying out corners.
- III. 213. Book of designspage 30
Sewing thru four holes, lettering cover.
- IV. 214. Weather recordpage 31
Observation of weather and careful pasting of weather flags.
- V. 215. Receipt-bookpage 34
Sewing several thicknesses of paper, gluing binders' cloth over outside fold.
- VI. 216. Note-bookpage 35
Sewing two sections together, gluing book into cover.
- VII. 217. Paged blank bookspage 36
Numbering of pages, study of arrangement of pages.

BOX PROBLEMS

- VIII. 221. Small square boxpage 71
Laying out box to dimensions, cutting and folding to measured lines.
- IX. 222. Rectangular open boxpage 71
Laying out larger measurements, making two measurements with one setting of rule.
- X. 223. Box with reinforced cornerspage 72
Scoring heavy material, use of stay tape on box corners.

CARD PROBLEMS

- XI. 231. Desk blotterspage 96
Cutting blotters to uniform size, punching and tying.
- XII. 232. Photo mountpage 98
Study of proportion and color in mounting, mounting upon double mounts.
- XIII. 233. Glass coverpage 100
Laying out of octagons, making simple octagonal designs.

ENVELOPE PROBLEMS

- XIV. 241. Paper bagpage 114
Folding, and cutting long fold.

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- XV. 242. Mailing envelopepage 116
Laying out several small measurements, careful pasting and folding.
XVI. 243. Long mailing envelopepage 116
Laying out and cutting rounded corners.

THIRD GRADE

BOOK PROBLEMS

- I. 311. Scrap-bookpage 42
Folding double center for book, gluing cover over leaves so as to make two sharp edges.
II. 312. Small sewed pamphletpage 44
Sewing two, three, four and five sections.
III. 313. Sewed pamphlet, reinforced back.....page 46
Gluing binders' cloth around square corner fold.
IV. 314. Cloth covered portfoliopage 47
Making of case for bookbinding :—pasting binders' cloth to cloth board, gluing laps down, pasting lining paper inside.
V. 315. Glued bookletpage 48
Gluing several sections one into another.
VI. 316. Cloth bound bookpage 49
Fastening sewed sections into case :—backing sections, gluing against covers, and lining.

BOX PROBLEMS

- VII. 321. Covered small boxpage 74
Fitting cover to box, pasting colored paper over box and cover.
VIII. 322. Pencil box with fitted cover.....page 76
Fastening corners with double paper.
IX. 323. Candy boxpage 77
Making end folds, fitting laps at ends.
X. 324. Folding boxpage 80
Very accurate laying out and cutting, fitting of folded tabs.

CARD PROBLEMS

- XI. 331. Post cardspage 101
Neat cutting of heavy material, making banded decoration.
XII. 332. Page holderpage 102
Punching and cutting between holes, cutting corners.

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- XIII. 333. Shipping tagspage 102
Laying out from center line, punching three thicknesses, tying loop

ENVELOPE PROBLEMS

- XIV. 341. Photo filing envelopepage 117
Laying out with care to exact size, gluing neatly.
XV. 342. Long filing envelopepage 119
Use of compasses, cutting of curved line.
XVI. 343. Large filing envelopepage 120
Cutting and gluing large pieces of heavy material.

FOURTH GRADE

BOOK PROBLEMS

- I. 411. Pocket paper filepage 52
Cutting of marking tabs, gluing of hinge.
II. 412. Desk paper filepage 54
Cutting tabs from heavy material, gluing large pieces of stock.
III. 413. Note-book coverspage 54
Making hinge of binders' cloth, punching holes and setting eyelets.
IV. 414. Portfolio with cloth corners.....page 58
Fitting of corners and back, gluing up carefully.
V. 415. Bound scrap-bookpage 61
Combination of problems number 311 and 316.
VI. 416. Bound drawingspage 61
Sewing thru cover and drawings.
VII. 417. Rebound book or bound magazinespage 62
Removing old covers and attaching canvas backing.

BOX PROBLEMS

- VIII. 421. Pin box with coverpage 81
Pasting cover paper over sides and cover of box.
IX. 422. Post card boxpage 83
Laying several measurements from center line, very careful folding, and neat gluing.
X. 423. Original boxpage 84
Designing box and making working drawing, cutting of straw-board, lining of box and cover.

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- XI. 424. Pen boxpage 86
Making of very accurate joints with strawboard and box board.
XII. 425. Sliding boxpage 88
Fitting of case to box.

CARD PROBLEMS

- XIII. 431. Postal scalepage 103
Gluing broad surfaces, marking with standard weights.
XIV. 432. Folder picture mountpage 105
Studying good proportion for double mount.
XV. 433. Desk padpage 107
Cutting and fastening of corners of heavy cover paper, fitting of blotters.

ENVELOPE PROBLEMS

- XVI. 441. Paper bag with foldspage 121
Double folding for typical paper bag.
XVII. 442. Flat envelope filepage 123
Making of flexible hinge, fitting of case to envelopes.
XVIII. 443. Book envelope filepage 126
Punching and tying envelopes within case.

B

PROBLEMS SELECTED FROM GROUPS

The selection of problems from the book group, the box group, the card group, and the envelope group in regular rotation has at least the advantage of adding the interest which comes from variety. The following arrangement is suggestive for this feature. (See B on page 137.)

FIRST GRADE

I.	111.	Mounting folders	.....	19
II.	121.	Square box	.....	67
III.	131.	Mounted drawings	.....	92
IV.	141.	Envelope folder	.....	111
V.	112.	Booklet folder	.....	20
VI.	122.	Square tray	.....	68
VII.	132.	Book-marks	.....	93
VIII.	142.	Square envelope	.....	112

PLANNING OF COURSES

IX.	113.	Pocket note-books	21
X.	123.	Rectangular tray	69
XI.	133.	Calendar	94
XII.	143.	Pocket for clippings	113
XIII.	114.	Book of color schemes	24
XIV.	115.	Drawing-book	25
XV.	116.	Laundry list	27

SECOND GRADE

I.	211.	Paper portfolio	29
II.	221.	Small square box	71
III.	231.	Desk blotters	96
IV.	241.	Paper bag	114
V.	212.	Paper portfolio with laps.....	30
VI.	222.	Rectangular open box	71
VII.	232.	Photo mount	98
VIII.	242.	Mailing envelope	116
IX.	213.	Book of designs	30
X.	223.	Box with reinforced corners	72
XI.	233.	Glass cover	100
XII.	243.	Long mailing envelope	116
XIII.	214.	Weather record	31
XIV.	215.	Receipt-book	34
XV.	216.	Note-book	35
XVI.	217.	Paged blank books	36

THIRD GRADE

I.	311.	Scrap-book	42
II.	321.	Covered small box	74
III.	331.	Post cards	101
IV.	341.	Photo filing envelope	117
V.	312.	Small sewed pamphlet	44
VI.	322.	Pencil box with fitted cover	76
VII.	332.	Page holder	102
VIII.	342.	Long filing envelope	119
IX.	313.	Sewed pamphlet with reinforced back.....	46

PAPER AND CARDBOARD CONSTRUCTION

X.	323.	Candy box	77
XI.	333.	Shipping tags	102
XII.	343.	Large filing envelopes	120
XIII.	314.	Cloth covered portfolio	47
XIV.	324.	Folding box	80
XV.	315.	Glued booklet	48
XVI.	316.	Cloth bound book	49

FOURTH GRADE

I.	411.	Pocket paper file	52
II.	421.	Pin box with cover	81
III.	431.	Postal scale	103
IV.	441.	Paper bag with folds	121
V.	412.	Desk paper file	54
VI.	422.	Post card box	83
VII.	432.	Folder picture mount	105
VIII.	442.	Flat envelope file	123
IX.	413.	Note-book covers	54
X.	423.	Original box	84
XI.	433.	Desk pad	107
XII.	443.	Book envelope file	126
XIII.	414.	Portfolio with cloth corners.....	58
XIV.	424.	Pen box	86
XV.	415.	Bound scrap-book	61
XVI.	425.	Sliding box	88
XVII.	416.	Bound drawings	61
XVIII.	417.	Rebound book or bound magazine.....	62

C

PROBLEMS ARRANGED ACCORDING TO DIFFICULTY

In the following, the problems are arranged in a sequence according to the difficulty of handling, regardless of groups of kinds of problems, as indicated at C on page 137.

FIRST GRADE

I.	111.	Mounting folders	19
II.	112.	Booklet folder	20

PLANNING OF COURSES

III.	115.	Drawing-book	25
IV.	141.	Envelope folder	111
V.	113.	Pocket note-books	21
VI.	116.	Laundry list	27
VII.	121.	Square box	67
VIII.	122.	Square tray	68
IX.	133.	Calendar	94
X.	142.	Square envelope	112
XI.	143.	Pocket for clippings	113
XII.	131.	Mounted drawings	92
XIII.	132.	Book-marks	93
XIV.	123.	Rectangular tray	69
XV.	114.	Book of color schemes	24

SECOND GRADE

I.	211.	Paper portfolio	29
II.	212.	Paper portfolio with laps	30
III.	215.	Receipt-book	34
IV.	231.	Desk blotters	96
V.	241.	Paper bag	114
VI.	232.	Photo mount	98
VII.	223.	Box with reinforced corners	72
VIII.	221.	Small square box	71
IX.	213.	Book of designs	30
X.	222.	Rectangular open box	71
XI.	214.	Weather record	31
XII.	216.	Note-book	35
XIII.	242.	Mailing envelope	116
XIV.	233.	Glass cover	100
XV.	243.	Long mailing envelope	116
XVI.	217.	Paged blank books	36

THIRD GRADE

I.	333.	Shipping tags	102
II.	332.	Page holder	102
III.	341.	Photo filing envelopes	117

PAPER AND CARDBOARD CONSTRUCTION

IV.	331.	Post card	101
V.	311.	Scrap-book	42
VI.	315.	Glued booklet	48
VII.	342.	Long filing envelope	119
VIII.	321.	Covered small box	74
IX.	314.	Cloth covered portfolio	47
X.	322.	Pencil box with cover	76
XI.	343.	Large filing envelope	120
XII.	316.	Cloth bound book	49
XIII.	323.	Candy box	77
XIV.	324.	Folding box	80
XV.	312.	Small sewed pamphlet	44
XVI.	313.	Sewed pamphlet with reinforced back.....	46

FOURTH GRADE

I.	421.	Pin box with cover	81
II.	431.	Postal scale	103
III.	432.	Folder picture mount	105
IV.	411.	Pocket paper file	52
V.	433.	Desk pad	107
VI.	412.	Desk paper file	54
VII.	415.	Bound scrap-book	61
VIII.	416.	Bound drawings	61
IX.	422.	Post card box	83
X.	413.	Note-book covers	54
XI.	423.	Original box	84
XII.	424.	Pen box	86
XIII.	441.	Paper bag with folds	121
XIV.	425.	Sliding box	88
XV.	414.	Portfolio with cloth corners	58
XVI.	442.	Flat envelope file	123
XVII.	443.	Book envelope file	126
XVIII.	417.	Rebound book or bound magazine.....	62

PLANNING OF COURSES

D

PROBLEMS SELECTED FROM ONE GROUP

Another way to arrange paper and cardboard problems having peculiar advantages is by concentration of attention and effort upon a more limited field of work, taking for instance the third grade for one group of problems such as book problems, and the fourth grade for another group, such as box problems. This concentration gives more ability in the lines undertaken, but does not open up so large a field. This work may follow either of the arrangements suggested for the first and second grades.

FIRST GRADE

See any one of the three arrangements suggested on pages 137, 142, and 144.

SECOND GRADE

See arrangements on pages 139, 143, and 145.

THIRD GRADE

Selections of book problems

I.	311.	Scrap-book	42
II.	312.	Small sewed pamphlet	44
III.	313.	Sewed pamphlet with reinforced back.....	46
IV.	314.	Cloth covered portfolio	47
V.	315.	Glued booklet	48
VI.	316.	Cloth bound book	49
VII.	411.	Pocket paper file	52
VIII.	412.	Desk paper file	54
IX.	413.	Note-book covers	54
X.	414.	Portfolio with cloth corners	58
XI.	415.	Bound scrap-book	61
XII.	416.	Bound drawings	61
XIII.	417.	Rebound book	62
XIV.	417.	Bound magazines	62

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FOURTH GRADE

Selections of box problems	
I. 321. Covered small box	74
II. 322. Pencil box with fitted cover	76
III. 323. Candy box	77
IV. 324. Folding box	80
V. 421. Pin box with cover	81
VI. 422. Post card box	83
VII. 423. Original box	84
VIII. 424. Pen box	86
IX. 425. Sliding box	88

If there are not enough problems for the time available in either the third or fourth grades, the problems suggested should indicate types of book and box making which may help in original work planned by the student. There are enough possible problems in either book or box making to occupy all the handwork periods for both grades. It may seem better to reverse the arrangement and put the box problems in the third grade and the book problems in the fourth grade.

It should be remembered that a half year is about all that can well be allowed for paper and cardboard work in each grade, if clay work and basketry and weaving are also undertaken.

VII

EQUIPMENT AND SUPPLIES

EQUIPMENT FOR THE CLASS ROOM

AS noted in the lists of materials required for the making of each problem, very few different pieces of equipment are required by any individual. The rule and scissors are required constantly, and should be ready for use at all times in good condition and with full count. If more than one kind of scissors be ordered for the different grades, small blunt pointed scissors are more suitable for the first and second grades, and larger sharp pointed scissors may be recommended for the third and fourth grades. Rules suitable for primary handwork should have a little extra distance before the zero mark, and a little beyond the 12" mark as indicated in the drawing at the bottom of page 29. If separate rules be obtained for each grade, the following are recommended: First grade—straight edge without marks; Second grade—rule marked with inches and half inches; Third grade—rule marked with quarter inches; Fourth grade—rule marked with eighth and sixteenth inches. These articles may be collected each day or allowed to remain with the pupil. If collected, special boxes should be provided so that everything can have its own place.

A medium pencil should be kept and handled by the same pupil at all times if possible, for sanitary reasons. A pencil eraser for each pupil will also be found a convenience.

A good supply of needles should be on hand in each class room, a few punches including one or two with eyelet set combinations, at least one good glue brush, and several sticks of wood sharpened to a chisel edge for spreading glue. Where a very little glue is needed, a wood toothpick is satisfactory. A kitchen knife, especially if the edge be dulled over an oil stone, makes a good magazine opener, and one or two will be found a convenience in each room for booklet work. A few compasses

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are also desirable, and a chip carving knife is useful for heavy card work if the heavy stock is not cut to size before being passed. For this heavy cutting, a piece of 9"x 12" cloth board makes a good protection for the desk. An eighteen inch steel straightedge is also an advantage in heavy cutting. For decorative work, such materials as are used in the drawing class will be found useful. These materials include: crayons, water colors with brushes, ink with pens and brushes. The following list may be taken as representing an adequate equipment for twenty-five pupils in paper and cardboard construction in one room, including demonstration equipment for the teacher, but not including freehand drawing equipment:

26 Scissors	at 15c to 25c	\$3.90 to \$6.50
26 Rules	2c to 15c	.52 to 3.90
26 Pencils	3c to 5c	.78 to 1.30
26 Erasers	1c to 5c	.26 to 1.30
3 Packages needles, No. 4,		.12 to .15
5 Eyelet punches	25c to 90c	1.25 to 4.50
5 Kitchen knives	5c to 15c	.25 to .75
5 Compasses	10c to 25c	.50 to 1.25
5 Carvers' knives	25c to 50c	1.25 to 2.50
5 Glue brushes	10c to 25c	.50 to 1.25
5 Paste brushes	10c to 25c	.50 to 1.25
1 Steel straightedge, 18"		1.00 to 2.00
	Total	\$10.83 to \$26.65

All of this equipment should be provided with neat racks or boxes, or at least should be kept at all times when not in use in a particular place in the teacher's storage closet. Nothing looks much worse in school than slovenly care of school apparatus. The supervisor should watch this carefully, and make suggestions as needed.

STOCK ROOM EQUIPMENT

If the school system be large enough to warrant it, a supply room for the supervisor should be provided with the following:

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- 1 Case containing sliding shelves for full sized sheets of paper and boards, one shelf for each kind of stock, and long doors extending from top to bottom over shelves.
- 1 Case containing pigeon holes for 9"x 12" cut stock, shelves to be 12 $\frac{1}{2}$ " deep, and openings to be 9 $\frac{1}{2}$ "x 9 $\frac{1}{2}$ ". A curved notch in each shelf for the hand assists in removing the paper.
- 1 Case containing shelves and drawers for small cut stock, thread, stay tape, eyelets, binders' cloth and backing, paste and glue, and miscellaneous small articles.
- 1 Case containing extra pieces of equipment and for storage of equipment during the vacation season.
- 1 Card cutter with blade at least 15" in length. It is desirable to have such a cutter in each fourth grade room except for expense. A good card cutter may be obtained for from \$7.00 to \$25.00.
- 1 Paper cutter to handle stock at least 20" wide. Cost varies from \$50.00 to \$150.00 according to size and strength, and whether for table or floor use.

Such a stock room if sufficiently large may be used for all of the primary handwork. Stock of all kinds, yarns, raffia, reed, clay, and other supplies, should be kept in special cases.

KINDS OF PAPER AND CARDBOARD

Many kinds of paper are suitable for primary handwork, and a few of them are used almost constantly, especially cover papers, book papers, and tag boards. Other papers are used but little, but are desirable in order that a wider acquaintance with paper qualities may be obtained. A collection of finished papers, and one showing stages in the manufacture of paper has an educational value well worth the effort necessary for making the collection. The following classification may be of value in the study of papers.

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The more important papers are:

Print paper,—Unfinished surface, for newspapers and cheap poster work, made from fibres of straw, wood, grasses, and paper waste.

Book paper,—Machine finished surface, cheaper varieties made from wood fibres.

Writing-paper,—Made with a surface suitable for ink, and with a firmness which will stand erasures, usually made from cotton and linen rags.

Drawing-paper,—Frequently made by hand, very firm, stands much erasing, made in surfaces from smooth to very rough.

Wrapping-paper,—A coarse paper of a yellowish brown color made from manila and other rope fibres, stands hard usage.

Cover paper,—Paper with a fancy color, an interesting texture, and a tough quality suitable for covering pamphlets.

Other papers and boards of more or less importance or given peculiar treatment in the process of manufacturing are:

Binders' board	Deckled-edge paper
Blotting-paper	Detail paper
Blue-print paper	Drawing-board
Bond paper	Dry proofing paper
Bristol board	Embossed paper
Calendered paper	Enameled paper
Carbon-paper	Ferro prussiate paper
Cardboard	Fibre wrapping-paper
Chinese paper	Fibre-faced paper
Cloth board	Filter-paper
Coated paper	Flat writing-paper
Cold pressed paper	Folded paper
Copying-tissue	Friction boards
Cotton paper	Glazed paper
Corrugated board	Gummed paper
Cross section paper	Hand-made paper
Cylinder paper	Hard plate paper

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Hot pressed paper	Plated paper
India paper	Polygraphic paper
Interleaving paper	Poster board
Japanese paper	Poster paper
Jute board	Post-office paper
Label paper	Press board
Laid paper	Printing paper
Ledger paper	Proofing paper
Letter-paper	Pulp board
Linen paper	Rag paper
Lining paper	Rice paper
Lithographic paper	Roofing paper
Litmus paper	Ruled paper
Loft-dried paper	Safety paper
Luminous paper	Sandpaper
Machine-sized paper	Sensitized paper
Manifold paper	Silk paper
Manila paper	Silver paper
Marble board	Sized paper
Marble paper	Soft plate paper
Matrix backing	Surface paper
Metallic paper	Stencil board
Mimeograph paper	Stereotype paper
Mounted paper	Strawboard
Mounting board	Tag board
Mounting paper	Tar board
Music paper	Tarred paper
News-paper	Tissue-paper
Note-paper	Tracing paper
Oil board	Transfer-paper
Oiled paper	Trunk board
Parchment paper	Tub sized paper
Pattern paper	Tympan board
Photographic paper	Typewriter paper
Pitched paper	Vellum paper
Plate paper	Waxed paper

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SIZES OF PAPER

The following table is given for convenient reference to stock sizes of some of the more common writing-, drawing-, and printing papers:

	WRITING	DRAWING	PRINTING
Flat cap	14"x 17"		
Cap		14"x 17"	
Demy	16"x 21"	15"x 20"	
Folio	17"x 22"		
Medium	18"x 23"	17"x 22"	19"x 24"
Royal	19"x 24"	19"x 24"	20"x 25"
Super royal	20"x 28"	19"x 27"	22"x 28"
Double cap	17"x 28"		
Imperial	23"x 31"	22"x 30"	22"x 32"
Small double medium			24"x 36"
Double medium	23"x 36"		24"x 38"
Double Royal	24"x 38"		26"x 40"
Double elephant	26"x 40"	27"x 40"	
Antiquarian	31"x 53"	31"x 53"	
			30"x 40"
Large sizes for newspapers			32"x 44"
			36"x 48"

TABLE OF PAPER COUNTS

A matter easily forgotten is the table of counts for paper. It is inserted here as a reminder:

24 sheets	equal 1 quire	24 sheets
20 quires	equal 1 ream	480 sheets (or 500 sheets)
2 reams	equal 1 bundle	960 sheets (or 1000 sheets)
5 bundles	equal 1 bale	4800 sheets (or 5000 sheets)

Drawing-papers and other high grade papers are sold with 480 sheets to the ream. Ordinary papers come 500 sheets to the ream.

PAPER MANUFACTURE

It is believed that a word or two regarding the manufacture of paper may be of value to teachers of primary handwork, so

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the following brief description of the process is inserted at this point along with the kinds, sizes, and counts of paper just given.

Until recent years paper was made principally from cloth scraps, and at present all high grade papers are still "rag" papers. Most of the printing paper at present however is made from such vegetable fibres as those from wood, straw, and grasses. The fibres are ground and bleached and then boiled to a soft pulp. In the hand-made papers this pulp is dipped into a large pan from which the water gradually drains away leaving a wet sheet, which is then pressed and dried. Some high grade papers are still made in this way by hand, but mechanical processes have almost entirely displaced the hand process.

The machine process is as follows:

- (1) The fluid pulp is floated over a continuous wire cloth which has a constant motion, and which allows the water to drain away.
- (2) The wet pulp is pressed under wire gauze rollers and more of the moisture taken up.
- (3) The pulp can now hang alone and support itself for a short distance and is carried to a felt band and led to felt rollers.
- (4) More water is pressed out between these felt rollers and the paper leaves them able to go unsupported to the metal rollers.
- (5) The paper is now passed to the heavy smooth calender rolls, and under great pressure is given a smooth finish and added drying. These calenders are sometimes heated and used to give a glaze to the paper.
- (6) It next is carried to the drying room and a current of heated air serves to drive away most of the remaining moisture.
- (7) From here it may be taken to the roller cutters and cross cutters, and be cut and tied into bundles for shipment.

This description while not including the chemical treatment, nor other details of the preparation of the pulp may be taken as fairly representative of the usual mechanical part of the process. For newspapers, the paper is usually delivered upon large rolls

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as they come from the machine. Colored papers are given the color before the fluid pulp reaches the machine.

TABLE FOR ORDERING PAPER

SUITABLE FOR PRIMARY HANDWORK CLASSES

MATERIALS	KINDS	DESIRABLE SIZES	COSTS	QUANTITIES
Cover paper				
Plain, laid, smooth, rough, gray, or colors		20x25—25 to 20x25—70 (35 to 60 lbs. weights desirable)	5 to 15c per pound	25 lbs. thin to 70 lbs. thick per ream (500 sheets)
Book paper				
English finish, egg shell finish, antique, laid, enameled, deckled- edge, white and tinted		24x36—50 to 25x38—70	4 to 8c per pound	50 to 70 lbs. per ream (500 sheets)
Print paper				
Light weight or heavy weight, white or colored		24x36—30 to 25x38—50	3 to 5c per pound	30 to 50 lbs. per ream (500 sheets)
Wrapping-paper				
Manila, white, fibre		12x18—7½ to 20x40—100 (24x36—40 desirable)	4 to 5c per pound	7½ lbs. light to 100 lbs. heavy, per ream (500 sheets)
Flat writing				
White wove or laid		17x22—16 to 19x24—24	6 to 12c per pound	16 to 24 lbs. per ream (500 sheets)
Ledger paper				
White wove		16x21—28 to 23x36—80	15 to 40c per pound	28 to 80 lbs. per ream (480 sheets)
Bond paper				
White or tinted wove		17x22—12 to 19x24—44	8 to 20c per pound	12 to 44 lbs. per ream (500 sheets)
Drawing-paper				
White or tinted		19x24	20 to 60c per quire	24 sheets per quire

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MATERIALS	KINDS	DESIRABLE SIZES	COSTS	QUANTITIES
Blotting-paper				
White or colored, plain or enameled		19x24—60 to 19x24—100	7 to 15c per pound	60 to 100 lbs. per ream (500 sheets)
Plated paper				
White or colored		20x24	\$2.00 to \$3.00 per ream	480 sheets per ream
Marble paper				
Spot, wave or agate		20x30	30c per quire	24 sheets per quire
Tissue-paper				
White or colored		20x30	60c to \$1.50 per ream	500 sheets per ream
Gummed paper				
White or colored		17x22 to 20x24	45c to \$1.00 per quire	24 sheets per quire
Strawboard		BOARDS		
Binders'		26x33 Nos. 35 to 100	\$1.00 per bundle	35 thick to 100 thin sheets per bundle
Cloth board				
Binders' gray		22x28 Nos. 12 to 50	\$1.00 per bundle	12 thick to 50 thin sheets per bundle
Pulp board				
White		26x38 Nos. 40 to 120	\$1.15 per bundle	40 thick to 120 thin sheets per bundle
Box board				
White coated		28x44 No. 016	\$2.50 per bundle	100 sheets per bundle
Marble board				
Green or brown		26x38—60	\$2.00 per bundle	60 sheets per bundle
Tag board				
Buff color		22½x28½—80 to 22½x28½—140	3 to 5c per pound	80 lbs. light to 140 lbs. heavy per ream (500 sheets)

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MATERIALS	KINDS	DESIRABLE SIZES	COSTS	QUANTITIES
Mounting board				
	Gray, black, or colors	22x28 5 ply or 10 ply	\$4.50 to \$6.00 per bundle	100 sheets per bundle
Press board				
	Red or gray	28x34—70	6c per sheet	70 lbs. per 144 sheets
Bristol board				
	Plain, folding, writing, embossed,	22½x28½ from	\$1.00 to \$5.00 per	100 sheets per
	White or colored	2 to 10 ply	100 sheets	bundle

If in doubt about weights and unable to see samples, order medium weights or numbers.

Boards should be ordered in full bundles if possible. Note the varied classifications of quantities in bundles, and specify very carefully.

CALCULATIONS FOR STOCK

In order to determine what amounts of paper stock to order for a school system, the following method will be found satisfactory:

- (1) Find the enrolment per grade for the first four grades of the entire system. The enrolment for a given year may be taken roughly for that of the following year if orders are to be placed before the enrolment is known.
- (2) Find the amount of 9"x 12" stock of each kind per pupil per grade. This may be taken from the bottom of tables on pages 161, 162, 163, and 164, or may be worked out from the listed amounts accompanying the directions in chapters II, III, IV, and V.
- (3) Multiply the amounts of stock per pupil for each grade by the number of pupils in each grade, and add from ten per cent to twenty-five per cent extra for new pupils who may enter later, for spoiled work, for extra problems, and for other exigencies.

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- (4) Find how many 9"x 12" pieces can be cut from the large sheets and divide the totals in (3), above, by this amount to get the number of full sheets.
- (5) Add enough to make up full ream lots of each style and weight if possible. If not, add enough to make up quarter or half reams. If this be impossible, any number of sheets may be ordered, but at an advance in price. The extra stock will help in starting the next year and should be deducted from the next year's order. School money should not be tied up unnecessarily in extra stock.
- (6) Check calculations for gross errors. An example of the calculation for the first grade is as follows:

Medium tag board 1 piece (from list at bottom of page 161)
times 150 (pupils) equals 150 (pieces); divide by 5 (the
number of pieces per sheet) and get

Suppose we get also	30 (full sheets in first grade)
	60 (full sheets in second grade)
	60 (full sheets in third grade)
	325 (full sheets in fourth grade)
	—
	415 sheets in all
Add to make ream	85 sheets extra
	—

Total medium tag board 500 sheets (or 1 ream, 110 pounds)

OTHER SUPPLIES NEEDED

In the same manner we may add each item and make up a full order for paper for the entire school year. Miscellaneous small supplies such as stay tape, eyelets, thread, silk cord, paste, and glue are easily figured out. A pint of paste and a pint of glue should make up an average requirement for each class room, altho the work in the fourth grade demands more than the first, and more will be wasted in some rooms than in others. An extra supply should be kept in the supervisor's store room.

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SOURCES OF SUPPLY

As far as possible it is desirable to purchase from local dealers but much of the material needed is special in character and must be gotten from special dealers. Certain dealers make a specialty of supplies for primary schools and the largest of these can supply most of the equipment and supplies listed here. These larger supply houses are located in such cities as Boston, New York, and Chicago, with branches in other cities. Most city superintendents have their catalogs. Other special houses carry papers, book binders' material, or printers' supplies.

The following list of kinds of supply houses may be of service to those in doubt as to where orders may be sent.

LOCAL HARDWARE DEALERS

Scissors, rules, knives, straightedges, eyelet punches, glue, and brushes.

LOCAL STATIONERS

Rules, pencils, erasers, compasses, paste, brushes, water colors, pens, ink.

LOCAL PRINTERS OR PAPER SUPPLY HOUSES

Papers, cardboards and certain kinds of binders' cloth.

LOCAL DEPARTMENT STORES

Needles, thread, string, silk cord, embroidery cotton, scissors, pencils.

LARGE PAPER HOUSES

Papers and boards of all kinds, usually in unbroken reams or bundles only.

BOOK BINDERS' SUPPLY HOUSES

Binders' cloth, leathers, and miscellaneous supplies and equipment.

PRINTERS' SUPPLY HOUSES

Card cutters, paper cutters, paper cabinets, (It is usually best to have cabinets built locally.)

DRAFTING SUPPLY HOUSES

Rules, pencils, compasses, straightedges, triangles.

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SPECIAL DEALERS IN PRIMARY SUPPLIES OR MANUAL TRAINING SUPPLIES

Papers of many kinds, binders' material, scissors, eyelet punches, stay tape, brushes, card cutters. (They will usually get whatever is needed.)

STOCK REQUIRED PER GRADE

On this and three following pages are listed the number of pieces of paper stock 9"x 12", with the totals per pupil added at the bottom of each page.

FIRST GRADE

	Thin tag board	Medium tag board	Heavy tag board	Rough cover, gray	Rough cover, colored	Book paper, white	Book paper, tinted	Print paper	Manila paper
111 Mounting folders				1½		1½			
112 Booklet folder				½		½			
113 Pocket note-books					1½			6	
114 Book of colors				1	¾				
115 Drawing-book				½		2			
116 Laundry list									2
121 Square box	1								
122 Square tray		½							
123 Rectangular tray			½						
131 Mounted drawings				1	1				
132 Book-marks		½							
133 Calendar					¾				
141 Envelope folder	½								
142 Square envelope							1		
143 Pocket for clippings	1								
Total pieces 9"x12" per pupil	2½	1	½	4½	3½	4	1	6	2

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SECOND GRADE

It will be noticed that heavier stock,—box board and press board,—and writing-papers, blotting-paper, and binders' cloth are added to first grade list of stock.

	Box board	Heavy tag	Rough cover, gray	Rough cover, colored	Plain cover	Book paper, white	Book paper, tinted	Bond paper	Flat writing	Manila paper	Blotting-paper	Binder's cloth
211 Paper portfolio				$\frac{1}{2}$								
212 Portfolio with laps.....				1								
213 Book of designs.....			$1\frac{1}{2}$		1							
214 Weather record					$\frac{1}{2}$	$\frac{1}{2}$	1					
215 Receipt-book				$\frac{1}{2}$				2				$\frac{1}{2}$
216 Note-book				$\frac{1}{2}$						2		
217 Paged blank books.....				$\frac{1}{2}$	1							
221 Small square box.....		$\frac{1}{2}$										
222 Rectangular box		$\frac{1}{2}$										
223 Box, reinforced		$\frac{1}{2}$										
231 Desk blotters				$\frac{1}{2}$								1
232 Photo mount				$\frac{1}{2}$								
233 Glass cover			$\frac{1}{2}$									
241 Paper bag					1							
242 Mailing envelope									1			
243 Long envelope								1				
Total pieces 9"x 12" per pupil.	$1\frac{1}{2}$	$\frac{1}{2}$	$1\frac{1}{2}$	4	$1\frac{1}{2}$	$2\frac{1}{2}$	1	3	1	2	1	$\frac{1}{2}$

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THIRD GRADE

Strawboard, cloth board, print paper, and marble paper are added to the stock of the second grade for bookbinding problems, and bristol board is added for folding box problems.

	Strawboard	Cloth board	Box board	Folding bristol	Heavy tag	Medium tag	Rough cover, gray	Rough cover, colored	Plain cover	Book paper, white	Book paper, colored	Print paper	Manila paper	Marble paper	Binders' cloth
311 Scrap-book						3		1							
312 Sewed pamphlet.								$\frac{1}{2}$							
313 Pamphlet, reinforced								1							$\frac{1}{2}$
314 Cloth portfolio .1													1	1	
315 Glued booklet ..								$\frac{1}{2}$							
316 Cloth bound book	1							2				20			
321 Small box			$\frac{1}{2}$						$\frac{1}{2}$						
322 Pencil box with cover		1						1					$\frac{1}{2}$		
323 Candy box				1											
324 Folding box				1											
331 Post card						1									
332 Page holder									$\frac{1}{2}$						
333 Shipping tags ..					$\frac{1}{2}$										
341 Photo filing envelope							$\frac{1}{2}$								
342 Long filing envelope								$\frac{1}{2}$							
343 Large filing envelope								1							
Total pieces per pupil, 9"x12" ...	1	1	1 $\frac{1}{2}$	2	1 $\frac{1}{2}$	2	3	5 $\frac{1}{2}$	1 $\frac{1}{2}$	3 $\frac{1}{2}$	3	20	$\frac{1}{2}$	1	2 $\frac{1}{2}$

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FOURTH GRADE

	Strawboard	Cloth board	Box board	Marble board	Bristol board	Medium tag	Rough cover, gray	Rough cover, colored	Plain cover	Marble paper	Blotting-paper	Binders' cloth
411 Pocket paper file						2						
412 Desk paper file						4						
413 Book covers	3								3			3½
414 Portfolio		2								2½		1
415 Bound scrap-book	1						1	1				1½
416 Bound drawings								2				
417 Rebound book*	*											
421 Pin box, covered			½				1					
422 Post card box			1									
423 Original box	2						2	2				
424 Pen box	½	½							½	½		
425 Sliding box		1					1					
431 Postal scale				½	½							
432 Picture mount							½	½				
433 Desk pad	1							1½	1			1
441 Paper bag with folds.....									1			
442 Flat envelope file	1				4					1		1
443 Book file	1				4					1		1
Total pieces per pupil, 9"x12".	7½	4	3	½	½	14	1¾	10	4½	8	1	8

* Material depends upon kind of problem selected.

VIII

HINTS TO TEACHERS AND SUPERVISORS

THE value of careful daily preparation in the work of teaching need not be emphasized here. It is no less important in the teaching of handwork than in any other subject. In some ways it is different. More materials and equipment are involved than in other work and the successful handling of these requires thoro organization and systematizing of the details involved.

Before attempting to teach an exercise in paper and cardboard construction the teacher should have made it. This is the first essential to a successful lesson. After having made the exercise a careful study should be given to the various steps in the process of construction and the order in which these should be taken up. A few minutes spent in this way will be the means of avoiding many mistakes later on. The making and the study of an exercise should reveal to the teacher what process in a given problem needs special attention and emphasis when it comes to teaching. The analysis of each problem as given in this book is intended to be suggestive and helpful but the teacher must work out each one for herself and make the analysis her own before she can teach the work easily and well.

It is very desirable to have wall cabinets, or cases, or shelving in which to store materials and equipment, and if such storage be provided, the materials and equipment can be kept in order and readily accessible. All such materials and equipment used in this work should be distributed, collected and cared for very largely by the pupils under the direction of the teacher. This kind of training which is brought about by having pupils keep things in place, orderly and neat,—is valuable and should not be omitted. Many good systems are in use for the handling of materials and every teacher will be able to find that certain methods are adapted to her conditions better than others. One good way is to have the first pupil in each row act as monitor to pass materials for that row. The last pupil in each

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row may collect materials. This passing and collecting should be done quickly and quietly and is usually done at the signal of the teacher. Another method is to select for monitors pupils whose behavior has been good during the lesson and who have worked well.

In connection with many of these lessons, it may be profitable to spend two or three minutes some time during the period in showing the relation of the problem in hand to those preceding it, and also to the work which is done outside the school. The various kinds of boxes, card problems, paper sacks, envelopes, pamphlets, and bound books may be shown and their construction explained. In this kind of study there will arise suggestions for original work which may be worked out by the pupils at home or as supplementary work during the regular period.

When directions are dictated to a class they should be brief and clear. No more words should be used than are necessary to convey the proper information but as a rule these directions should take the form of complete sentences. Certain forms of expression are apt to be used repeatedly and hence become monotonous. The teacher should make an effort to vary her forms of expression from lesson to lesson, which will not only relieve the monotony, but it will be the means of enlarging the pupil's vocabulary and broadening his powers of expression. The blackboard and chart are freely used in this work and are not only valuable aids in the giving of directions but are essential to the broad development of the powers of the pupils in receiving information. In blackboard drawings a dotted line or a very light continuous line may be used to represent folds and a full line will show where the material is to be cut. Another valuable method for first and second grades especially, is to actually go thru every process and make the complete exercise before the class. Sometimes this is done before the pupils begin work, and during such a demonstration the pupils are expected to notice exactly what the teacher does and to remember this.

HINTS TO TEACHERS AND SUPERVISORS

so that when the signal is given to begin work each pupil will be able to make the exercise completely from his own knowledge. At another time the teacher may make the problem step by step and have the pupils make it at the same time. Sometimes an exercise is given completely by dictation. This trains pupils in power to receive impressions thru the sense of hearing. A good lesson in this work is marked by strict attention to directions, concentration and earnestness while at work, and a spirit of cheerfulness and enjoyment thru the whole lesson.

The supervisor of primary handwork should have his course well organized before the beginning of the school year in order that he may show his teachers the substance of the whole course and the importance and relation of the several parts. He should have studied the subject thoroly with reference to class room conditions and the benefits that may be derived by the average pupil. His study of the subject should continue and may be most profitable during the time he has supervision of the work. His association with teachers and pupils should reveal the good in the work and enable him to eliminate such as is of less value. The opinions of the teachers who are handling the work successfully should be of much help to the supervisor.

In order to present the work, the supervisor usually holds teacher's meetings once a month or as often as seems necessary. Sometimes these meetings are held on Saturday, but usually after school hours during the school week. If it be possible, arrangements should be made to meet the teachers before four o'clock in the afternoon, because good results can not be accomplished if the teachers are weary and exhausted after a hard day's teaching. Teachers of the same grade may meet at one time or if the city is not large, the teachers of several grades may come together to study the work. At these meetings the supervisor should have for each teacher, outlines of the work, which may be in the form of typewritten sheets, blue-prints, or printed matter. At each meeting the details of the course should be carefully considered, and in some cases where the grade

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teachers are inexperienced in this work, the supervisor should have the material at hand and give each teacher an opportunity to make, under his direction, several or all of the exercises which she will teach. But whatever the means employed, the supervisor must see that each teacher understands the work thoroly and has some power to execute the various processes involved.

Methods of handling the work in the class room should be suggested, but each teacher ought to be allowed freedom in using her own ideas on how to teach any problem. The work of the supervisor is to show what is to be done and several ways in which it may be done. The grade teacher determines for herself very largely how the work is to be done. If a teacher is not doing good work, it is the business of the supervisor to show her where she is failing and indicate clearly certain lines of procedure which will make the work more successful. Construction work can be carried on in an orderly way, and whenever it is not, the supervisor should call attention to this matter and demonstrate, if necessary, what is desirable in the management of a class.

Chapter VII takes up the selection of equipment and supplies, methods of calculating amounts needed, and the placing of orders. A word remains to be said here regarding the routine handling of these materials for the school system. A matter of first importance is to remember that several weeks should be allowed for orders sent away so as to assure delivery in time for preparation and distribution to teachers. Frequently, a delay on the part of the school board causes embarrassment for the supervisor, and must be guarded against by allowing extra time. It is the business of the supervisor to watch things thru, and make sure that no form of office system prevents work in the class room being done properly. Duplicate records of all orders should be kept for following up orders, for checking deliveries, for approving bills, for summarizing the work of the department, and for making estimates for the following year.

HINTS TO TEACHERS AND SUPERVISORS

Next to seeing that orders are properly placed and deliveries properly made, the supervisor must see that materials are conveniently assorted and stored, and that paper requiring to be cut is attended to in time for use. Much of this work can be done some time in advance, and papers counted and wrapped and labeled ready for the different teachers. If much cutting is to be done, a large paper cutter should be available, altho a course similar to that planned in this book can eliminate a large part of this cutting by having paper cut to uniform sizes of 9"x 12" and 6"x 9". Cases for handling this cut stock are suggested in chapter VII.

In the delivery of supplies to schools, some system should be devised that will insure regularity and promptness. In a small system the janitors may be required to attend to such details. Where a city has regular delivery wagons, the handling of supplies is an easier matter. In many cities, the supervisor may find it more convenient to carry a few bundles of stock with him when he makes his visits, or have the teachers take parts of the supplies after a teacher's meeting, or have boys come from the schools at assigned hours to the central stock room. Whatever kind of delivery is attempted, it is most important to see that it works.

Exhibits may be made from time to time for the purpose of interesting the people of the community in this kind of work. It may also be an inspiration to both teachers and pupils and deepen their interest in the course as a whole. Such exhibits may be held in the class room if no better place be available. If held in the class room, it should be concentrated upon a panel in one part of the room, or upon a long shelf along one side of the room, or in an exhibit case.

While one exhibit is in place other material should be removed from the walls to avoid confusion. Exhibits of hand-work, freehand drawing, reproductions of art, grasses, minerals, fabrics, and other educational material may well be used in succession, but there should be only one kind of an exhibit at a time on the walls.

IX.

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BOOKS and reports and magazine references are listed below for further study of some of the details suggested in this book and for further discussions on certain of the points of view and methods briefly touched upon here.

While certain of the references do not carry out the ideas of the authors and others are in direct opposition to their conception of the purpose and scope of primary handwork, they are included here for the sake of a full analysis of the subject. There has been no attempt thruout this book to build up an argument for any point of view, but to present such material as will be found of use to teachers of primary handwork.

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Beginning Woodwork, At Home and in School. By Clinton S. Van Deusen.

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A work book for the use of students in grammar grade classes. It consists of working drawings and working directions. The projects are such as have proven of exceptional service where woodworking and mechanical drawing are taught in a thoro, systematic manner in the seventh and eighth grades. The aim has been to provide successful rather than unique problems. The 50 projects in the book have been selected and organized with the constant aim of securing the highest educational results. The book is especially suited for use in connection with "Essentials of Woodworking" by the same author. Price, 75 cents.

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A manual on furniture design. A book that will stimulate and encourage designing and initiation on the part of the student. It contains a collection of plates showing perspective drawings of typical designs, representing particular types of furniture. Each perspective is accompanied by suggestions for rearrangements and the modeling of parts. The text discusses and illustrates principles of design as applied to furniture. A practical and helpful book that should be in the hands of every teacher of cabinet making and designing. Price, \$1.00.

Problems in Furniture Making. By Fred D. Crawshaw.

The revised and enlarged edition of this well-known book contains 43 full-page working drawings of articles of furniture. Every piece shown is suitable for construction in high school classes, and is appropriate and serviceable in the home. In addition to the working drawings, there is a perspective sketch of each article completed. There are 36 pages of text giving notes on the construction of each project, chapters on the "Design," and "Construction" of furniture, and one on "Finishes." The last chapter describes 15 methods of wood finishing, all adapted for use on furniture. Price, \$1.00.

Problems in Woodworking. By M. W. Murray.

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Workshop Note-Book—Woodworking. By George G. Greene.

A small-size textbook and note-book combined. It furnishes a few general and extremely important directions about tools and processes; and provides space for additional notes and working drawings of exercises and articles which the pupil is to construct. It is essentially a collection of helps, ideas, hints, suggestions, questions, facts, illustrations, etc., which have been prepared by a practical teacher to meet a real need in his own shop. The note-book is full of suggestions; shows a keen insight into subject matter and teaching methods and is an effective teaching tool. Price, 15 cents.

Manual Training Toys for the Boys' Workshop. By H. W. Moore.

A popular boys' book that is truly educational. The book contains 111 pages, 35 of which are full-page plates of working drawings illustrating 42 projects. All the projects are overflowing with "boy" interest, are well adapted to the upper grades of the elementary school and are new in the manual training shop. The text treats of tools and tool processes and gives instructions for making each project. Price, \$1.00.

The Construction and Flying of Kites. By Charles M. Miller.

This contains twenty-two illustrations, including seven full-page plates of drawings of kites—over forty kites shown. Details of construction given, a kite tournament is described. Full of interesting suggestions. Price, 25c.

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A collection of sixteen problems in woodworking. Each problem has been put to the test and has proven satisfactory to the teacher who designed it and to the pupil who made it. Price, 20 cents.

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A students' textbook consisting of 80 plates, classified into groups according to principle and arranged according to difficulty of solution. It furnishes teachers of classes beginning mechanical drawing with a large number of simple, practical problems which have been selected with reference to the formation of good habits in technique, the interest of the pupils and the subjects generally included in a grammar and first-year high school course. Each problem is given unsolved and therefore in proper form to hand to the pupil for solution. Price, 75 cents.

Practical Typography. By George E. McClellan.

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